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ORIGINAL ARTICLES.

PROBLEMS IN SURGERY.[1]

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PROBLEM I. *A man in fine health, thirty years of age, falls before a moving railroad train and has his arm crushed and severed from the body just below the shoulder. Seen an hour after the accident, he has a fairly good pulse, is perfectly conscious, has "reacted" well, has a good moral and physical history. Shall the surgeon proceed to amputate?*—The simple problem of shock is to be met. This is a most important question. It has been studied critically for a century. I cannot enter upon a discussion of it now. I can only state my own impressions, experience and practice, and leave the subject undefended. My answer is, *No.* I care not how soon after a railroad accident the patient is seen, there are elements common to all cases that cannot be estimated by any instrument of precision. Who can estimate the agony of the man as he falls, as it were, into the jaws of death? Who can estimate the shock, even if he escape bodily harm? Who can estimate the pain produced in the severance of the limb at a point so near the trunk? Add to this the unavoidable loss of blood—and I need no more to convince me that the man, with his "fair pulse" and "good reaction," is yet in too profound a state of shock to add to it. It were better by far to carefully wash the lacerated stump with warm bichloride solution, to dress it with as much care as if amputated, to leave the man for at least twelve hours, and secure for him the best of all restoratives, sleep—and even then do not amputate simply because he has had *time* to react. As there is no means of estimating shock, so there are no criteria by which we can estimate its subsidence. One of the blessings of modern surgical methods is that a lacerated stump can be kept uncontaminated for days, and the amputation suffer nothing by the delay.

Men for ages have taught, and are still teaching, that if you find a man immediately after an accident, even though he be in a state of profound shock, the amputation adds nothing to the magnitude of the shock nor danger to the patient. To this I have simply to say that if you could drag the poor fellow from under the wheels of the car, and place him immediately upon the amputating table, with everything in readiness, such an act would be wanting in good common sense. In such a case I would by all means dress the wound with scrupulous care and defer amputation for at least a day. Upon this point few will agree with me. Let those who hold a contrary opinion stop and reflect upon the number that have died upon the operating-table, or within six hours after amputation, and, if their experience is like my own, they will recall cases in which their judgment was at fault, and that the increment of shock from the amputation was sufficient to turn the scale adversely. There were formerly arguments against delay that do not exist now. The advances in surgical methods make possible, and often of vital importance, the delays of which I speak.

PROBLEM II. *There is an injury to the foot of such a nature that a portion of the tarsus can be saved. Shall we select a Chopart, or a Pirogoff?*—The question is as to the point of amputation. It is an axiom in surgery that when a limb is injured one should save all he can. Were I to lay down a rule I would base it on the function of the limb. The function of the upper extremities is *prehension*, hence save all you can. A finger or half a finger may be of priceless value. The function of the lower extremities is *locomotion*, hence the operation should be adopted that will yield the best results. Upon this head we can learn much from the makers of artificial legs. One that I consulted, alluding to Chopart's and Pirogoff's operations, said: "Amputations about the ankle always make poor walkers. Every leg-maker will tell you so." Another, referring to the same class of amputations, said that in such cases he was able to fit limbs, but that the best walkers were those that had a few inches below the knee. The testimony of the patients themselves is of great value. Men who can hunt, mount the saddle, run up and down stairs, hardly miss the amputated part; but this cannot be said of those in the case of whom the Chopart or the Pirogoff operation has been performed. Such men can walk slowly and conceal their defects, but they cannot walk fast or run without a decided limp. Upon this subject I fully indorse the sentiments of Dr. Mordecai Price, expressed in a valuable contribution to surgery.[1] The same criticism applies

[1] Being the Annual Address in Surgery read before the Medical Society of the State of Pennsylvania, June 4, 1891.

[1] Trans. of the Philadelphia County Medical Society, 1889.

to amputation through the knee-joint. The rule, "Save all you can," has in this connection, as in others, been of great detriment. Leg-makers (and leg-wearers confirm their statement) say, Never amputate through the joint unless you saw off the condyles; but it is far better to amputate just above the condyles. Don't amputate through the joint; go *above or below it*.

PROBLEM III. *Shall we use ligatures in our amputations?*—Ambroise Paré introduced the ligature and surgeons have ever since been trying to do without it. Acupressure had its brief hour of notoriety: torsion has shown itself to be safe, even upon the axillary and femoral arteries. But the ligature triumphs—not that of its immortal author, large, clumsy, and septic, with one end sticking out of the wound, but the ligature of the finest, choicest, strongest sterilized silk, or animal fibre, cut short, and allowed to remain. For the smaller vessels the hæmostatic forceps suffices. He who introduced these should have a monument beside that of Ambroise Paré. Other questions, such as those pertaining to fractures, to drainage, suturing, dressing and re-dressing, all present themselves, but I cannot delay to present them.

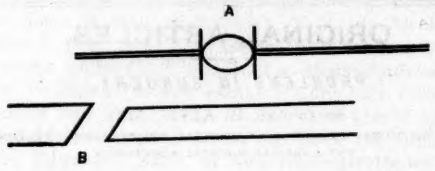
PROBLEM IV. *A woman, seventy-five years old, has fallen and fractured the neck of the femur. What shall be the treatment?*—The conditions of the problem are clear and distinct, yet what differing results are obtained! One will apply weights, demand absolute rest, reap a harvest of bedsores—and an early death. Another, following the directions of Sir Astley Cooper, will disregard the fracture, treat the woman, get her out of bed in a week, if she will bear it, with a good useful limb to reward him for his pains.

The prevailing deformity in fractures at the upper third of the femur, exclusive of the neck, presents a striking uniformity; in many cases the patient remains a cripple for life. Two problems present themselves: Why is the man with a strongly united bone, lame, and why do we remain satisfied with a mode of treatment that cannot fail to produce deformity?

Up to this point I have selected every-day accidents to illustrate the problems that present themselves. The answers are best known to the medical profession. I wish now to direct attention to a line of work that should engage our serious attention, and to problems that, as a profession, we have disregarded, or upon the solution of which we have looked as impossible.

PROBLEM V. *A child falls and injures its elbow; a fracture is discovered. The bone unites, but the forearm wastes; the fingers are contracted; there is every evidence of a nerve lesion associated with the injury. Six months wear away; massage and electricity are employed without avail. What shall be done?*—I have seen four such cases. Erichsen also reports some of the same kind. I have in three instances advised a mode of treatment that seems to me rational, but I have never been permitted to carry it out. I would cut down upon the nerve and excise the cicatrix (A, Fig. 1), and measure the

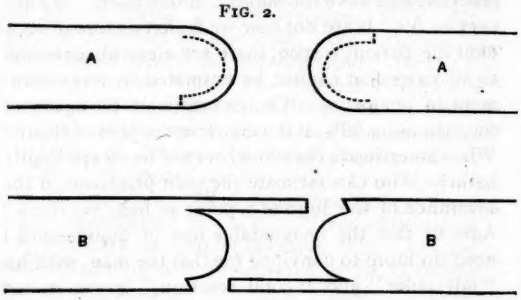
FIG. 1.



length of nerve removed. If the gap were considerable, say an inch, I would remove the same length of bone from the humerus (B) at a point some distance above, reunite the humerus, suture the nerve, and close the wound.

PROBLEM VI. *Both bones of the leg are broken; the fibula unites; the tibia fails to unite. How shall we proceed?*—It is not a difficult matter to bring about union of the tibia by removing a section of the fibula; but the real difficulty lies in lengthening

FIG. 2.



the tibia. Phelps has made an honest effort at lengthening the bones under conditions somewhat similar to those stated. The bone-dowel has been tried for the same purpose, and decalcified bone chips have been implanted in the hope of inducing recalcification. To lengthen bone, to restore a lost joint, suggests problems that it seems hard to think are beyond the skill of man.

My suggestion is as follows: Let A, A, Fig. 2, represent the ends of the unuited tibia. If the periosteum, with sufficient superimposed connective tissue, be dissected from A, A, as represented in B, B, and the intervening space be filled with bone chips, it is possible that the tibia could in this way be reproduced.

PROBLEM VI. *The surgeon, in operating for the radical cure of hernia, incautiously cuts the vas deferens. Shall he suture the divided ends?*—Here is a subject that may well engage attention. The lumen of the spermatic canal is very small. Unless perfect

approximation be secured, there must supervene a mechanical obstacle to its ever again acting as a duct.

Fig. 3 illustrates how any defect in approximation would be fatal to its function. The subject presents a problem worthy of careful study.

FIG. 3.

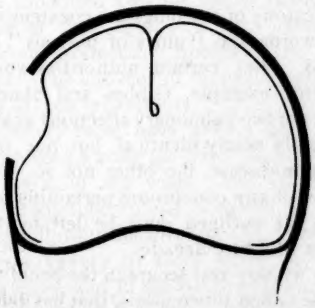
The most important tubular structures in the body are the arteries. It is sad to think that the division of the femoral artery, by a stab from a penknife, may prove fatal to life or limb. How helpless a surgeon feels, that he must at times amputate a limb to save life, when the only injury is that before mentioned. Must we always stop where we are? Must the retraction and contraction of arteries, the tendency to clotting, the secondary hemorrhage and tendency to aneurism, ever remain bars to progress in this direction?

In the ordinary phlegmonous abscess we note its maturing in a fortnight, its spontaneous rupture and rapid healing. There is a single point in this that I desire to notice, viz., its rapid, spontaneous cure. This is due to its collapsing. The abscess forms in soft tissues that render collapse certain. Abscesses in bone cannot heal by a collapse of their walls: they always pursue a tedious course.

In connection with the principle of the collapse of an abscess let me consider an injury of the skull resulting in the formation of an abscess.

PROBLEM VII. *A blow is struck or a wound inflicted upon the skull; a cerebral abscess forms; pus is found in the wound or upon trephining. What is the proper treatment?*—Can such an abscess heal by col-

FIG. 4.



lapse of its walls? Certainly not. Such cases are far too often fatal. Pus tends to find a dependent outlet when it cannot readily flow off. What shall be done? I would suggest the removal of a sufficient amount of the skull to permit the dura to fall in with approximation of the abscess walls. This is illustrated in Fig. 4.

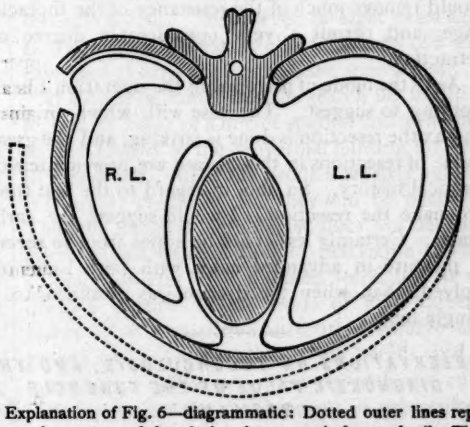
In hydrocephalus we have an analogous condition. To aspirate ventricular fluid contained in a closed, bony cavity, is likely to do more harm than good. In hydrocephalus both ventricles are usually filled; there is symmetrical dilatation; there should be a provision for symmetrical contraction; hence the plan of the removal of a portion of the vault of the skull, extending through both parietals. This is illustrated in Fig. 5. It is possible to remove the

FIG. 5.

bone from the sinus and not wound the latter. Then gentle, symmetrical compression, together with constitutional remedies, would hold out a prospect of return to normal conditions.

There is still another field, a most important one, in which the lesson from the collapse of an abscess suggests a remedy. I allude to pulmonary tuberculosis. Why this disease is not self-limiting in pulmonary tissue, as it is in the head of the femur, is

FIG. 6.



Explanation of Fig. 6—diagrammatic: Dotted outer lines represent the contour of chest before the removal of part of a rib. The deeper, dark lines show how much the chest has sunken in. The greater shrinkage is to be found on the side from which the section of rib has been taken, as will be seen by comparing the two lungs.

not to be explained by the nature of the disease itself. The tuberculous joint can throw off the disease. In pulmonary tuberculosis the system makes a most desperate effort to accomplish the same end, but fails. Nature gives us a hint as to the way in

which we should proceed. Who that has made an autopsy in a case of advanced phthisis has found the pleura? What has become of it? Nature has glued its two surfaces together. The lung is fastened to the chest-wall. Nature puts forth all her energy to cause collapse of the chest-cage. She succeeds but in part. The sunken chest is an illustration of Nature's mode of causing shrinkage of the abscesses in order that she may effect a cure. Why not follow this hint and seek to give relief by the retraction that would follow a resection of the ribs?

I would make the following suggestions:

(1) At what point make the resection? As near the angle of the rib as possible, *i. e.*, in the lateral or postero-lateral aspect of the chest. A glance at Fig. 6 represents the short portion of the rib unaffected by the section. This, I think, will unquestionably be the result. The long part of the rib is now attached only to the vertebral column through the sternum and the corresponding rib of the opposite side. It becomes a long lever, and can be most readily acted upon by atmospheric pressure.

(2) How much of each rib should be resected? At least two inches, possibly three. I say at least two, for no possibility should be afforded for the bone to be reproduced. To this end the periosteum should be removed with the bone. A cicatricial fibrous band will form that will answer every purpose.

(3) How many ribs should be resected? At the very least four, and these should be the longest. A resection of the fifth, sixth, seventh and eighth ribs would remove much of the resistance of the thoracic cage, and permit a very considerable degree of retraction.

As to the mode of performing the operation I have nothing to suggest. The ease with which in pyothorax the resection is done is striking, and the great value of resections in this disease are now matters of surgical history. So, too, in regard to the best time to make the resection. I would suggest the early stage. Certainly less could be hoped from so severe a measure in advanced cases, with both lungs involved, than when the disease was confined to a single lung.

OBSERVATIONS ON TUBERCULOSIS; AND THE DIAGNOSTIC VALUE OF THE TUBERCLE BACILLUS.[1]

BY HENRY SEWALL, M.D., PH.D.,
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THERE is probably not in the whole nosology a more sharply defined disease than tuberculosis. The ideal of scientific classification is approached when the structural changes of a disease can be used to guide and determine the procedures of surgical art. Thus, hesitating to perform a radical operation, a surgeon opens a cavity suspected of being tuberculous, and sends a portion of the diseased tissue to the adjoining pathological laboratory; in ten minutes word is returned that the tissue is tuberculous, and all doubt and hesitation on the part of the operator are removed.

Darwin and others have shown that animals in their evolution from ancestral forms have diverged in groups that, though remaining distinct and well defined at their centres, may be inextricably blended at their adjoining borders, making a rigid classification impossible. In the same way in diseases that in many cases are but the effects of developmental life—*i. e.*, of germs—there is often doubt as to classification when the symptoms and lesions are common to different disorders. There is thus a broad borderland surrounding the type of tuberculosis in which are represented maladies the nature of which is in dispute. According to Welch, there are many authorities that consider it proved that scrofula is but a peculiar manifestation of tuberculosis, although probably a great majority of medical thinkers still consider the question *sub judice*. Again, evidence has abundantly accumulated for the opinion that lupus is simply a tuberculosis of the skin; yet so eminent an authority as Jonathan Hutchinson, in a recent discourse, after throwing doubt upon the bacillary origin of lupus, said: "The result of Koch's injection treatment may possibly force us to believe that there is something about lupus that connects it far more closely with tuberculosis than I have admitted." Then, again, there is the oft-fought battle over the relationship of tuberculosis and pulmonary phthisis. I think it may be said, without fear of contradiction, that an immense majority of those competent to discuss the question hold that, with certain definite exceptions, phthisis and tuberculosis of the lungs are coextensive terms; in other words, the "unity of phthisis" has been established. But certain authorities worthy of a hearing (for example, Gibbes and Shurly) insist that there are two pulmonary affections anatomically and clinically nearly identical, but one of them a specific germ-disease, the other not so. Universal acceptance of any conclusions pertaining to the subjects thus far outlined must be left for the wider knowledge of future decades.

To-day we may rest secure in the belief that there is a disease called tuberculosis, that has definite clinical and anatomical features, and that is characterized by the invariable occurrence of a certain microscopic parasite known as the "tubercle bacillus."

In a work that ranks with Harvey's demonstration of the circulation of the blood, Robert Koch, just nine years ago, proved that the tubercle bacillus is the cause, and not simply the accompaniment, of

[1] Read before the Medical Society at Denver, April 21, 1891.

tuberculosis; and incidentally he proved that tuberculosis is an infectious disease, the agent of infection being the bacillus itself, transmitted from one individual to another. Koch's work has withstood every assault that adverse ingenuity could bring to bear upon it. Koch's conclusions were derived from experimental observations on the lower animals, which proved, as we have said, the bacillary origin and infectiousness of tuberculosis.

But in the case of our human brother it is, for obvious reasons, difficult to reach early and safe conclusions on these subjects, and I have been led to believe that only a comparatively small minority of the medical profession admits the infectiousness of tuberculosis in man. Still, anyone may find abundant evidence that tuberculosis is transmissible, and that, moreover, the avenues for the reception of the virus—*i. e.*, the bacillus—are the air-passages, the alimentary canal, and open wounds. In pulmonary phthisis the agent of infection is expelled from the body, so far as known, only in the expectorated sputum.

It may not be out of place to rehearse a few of the many observations that have recently been made with reference to these points. Cornet, in his remarkable work on the infectiousness of tuberculosis, found that the air expired from the lungs of phthisical subjects was never infectious, but he found that the dust wiped from the wall at the back of the beds of such patients produced tuberculosis in guinea-pigs inoculated with it. No forms of bacteria rise from a still, moist surface; it is the drying of the sputa that allows these minute organisms to be wafted about as impalpable dust. Cornet wiped the dust from the walls of hospital-wards and waiting-rooms and injected the various specimens into rabbits and guinea-pigs. The results were negative, except in those cases wherein the dust came from rooms inhabited by tuberculous patients that were careless of their sputa; in such cases tuberculosis was often produced. Another class of facts is as follows: The convent of Frauen Chemsee is on an island of 300 inhabitants. Since the beginning of this century there have always been a few deaths from phthisis among the inhabitants, but never more than seven in ten years. Not until 1860 had a death from tuberculosis occurred in the convent. In each following decade, however, there were, among the from twenty to forty nuns, two deaths from tuberculosis, and in the last decade there were eleven sisters ill with the disease. Many similar observations might be presented illustrating the communicability of the disease. Again, Cornet has gathered the vital statistics of the Catholic orders of nurses in Prussia for the last twenty-five years. These institutions contain a yearly average of 4028 persons, who usually enter at the age of twenty-five, after a medical examination and having been certified as healthy. But the average age at death was 37.27 years, or ten years below the normal. Three-quarters of these deaths were from tuberculosis. Avendario has reported a case of tuberculous infection of a boil in a patient placed in the same hospital ward with consumptives; parts of one lung were secondarily infiltrated. It has been found that when an extract of a pure culture of tubercle-bacilli is fed to animals, the bacilli penetrate the epithelium of the alimentary canal and produce general infection. A dilution of tuberculous sputum of 1:400,000, injected into guinea-pigs, still produces tuberculosis. Careful statistical enumeration also shows that tuberculosis, or, perhaps better, a disease having the physical signs and clinical history of phthisis, is responsible for one-seventh of the deaths from all causes, while during the productive period of life one-third of all deaths may be attributed to it.

Whatever theories as to the unity or duality of phthisis may be held, it is hardly to be doubted that a vast majority of the cases are of bacillary origin. Ever since the demonstration of the tubercle bacillus in 1882, investigators all over the world have been on the lookout for evidence to invalidate the doctrine of the germ origin of the disease. Yet I find in volumes v. to vii. of the *Centralblatt für Bacteriologie*, in which is gathered the current literature of bacteriology for the years from 1888 to 1890, but two recorded cases of death from disease presenting the clinical history and post-mortem appearances of pulmonary phthisis, but in which it was not possible to demonstrate microscopically the presence of tubercle bacilli. Some seven or eight years ago, E. L. Trudeau published the clinical history of a similar case, and Gibbes appears to have seen several.

It should be noted that the search for bacilli in a section of tissue or a film of sputum under the microscope is similar to the proverbial hunting for needles in a haystack; unless the needles be fairly numerous, it is highly probable that they will be overlooked. Thus the surgical pathologist does not depend on microscopical examination to determine the tuberculous character of a diseased joint, but he withdraws a portion of the tissue or fluid therefrom, places it in a nutritive medium favorable to the growth and multiplication of the bacilli, and then inoculates a rabbit or guinea-pig with the culture, and watches for the development of tuberculosis in the animal. I have known the two or three bacilli on a slide containing a film of tuberculous sputum to be overlooked, though carefully searched for by more than one observer. Therefore, negative microscopic evidence as to the presence of bacilli in sputum or tissue must be received with caution.

Let us now briefly consider the morphological and vital characters of the tubercle bacillus which, I have

presumed to be the etiological factor in the disease. The size and form of the bacilli in general are variable, but there is something characteristic in each individual that the trained eye readily distinguishes. The bacillus tuberculosis is one of the minutest of the rod bacteria. The length of the single rods varies from one-quarter to three-quarters of the diameter of a human red blood-corpuscle; the majority have a length of from 3 μ to 4 μ, the width of the microbe being but one-fifth to one-sixth the length. The bacillus may appear in the form of a rod that is either very short or long, or of a long rod apparenly made up of short joints; or the protoplasm of the rod may be aggregated into minute spores. But it is the reaction to staining reagents that distinguishes the tubercle bacillus from all other bacteria except the bacillus of leprosy. It absorbs dyes much more slowly and gives them up much more reluctantly than do other bacteria; it is on account of this micro-chemical reaction that it is possible to distinguish the tubercle bacillus in a medium containing any number of other bacteria.

During the past year, while resident physician at the Adirondack Cottage Sanitarium for the Cure of Phthisis, I had valuable opportunities for studying some of the little-known factors in the history of tuberculosis. One principal object of my observations was, if possible, to discover some constant relation between the microscopical and chemical characters of the tubercle bacilli, as demonstrated in the sputum—such as their size, shape, number, and staining reactions, and the clinical history of the patients as represented by physical and rational signs showing their general condition of vitality. According to their signs and symptoms, patients were divided into four classes: 1, those that were undoubtedly on the road to recovery; 2, those that were simply holding their own; 3, those the condition of whom was doubtful; and 4, those that were undoubtedly failing. I had the pain of finding few positive replies to the questions to which I sought answers, still the results were not altogether barren. Like other observers, I found but little correspondence between the gravity of the clinical symptoms or signs and the number of bacilli in the expectoration. In some of the worst cases, the bacilli were comparatively few, though they were constantly least numerous in patients that seemed very near recovery; the microbes were apparently most numerous in the sputum of those invalids with extensive signs of pulmonary trouble, but the course of the disease of whom had become arrested. There seemed a tolerably well-marked connection between the size and shape of the individual bacilli and the virulence of the disease. As had been previously suggested to me by Dr. Trudeau, of Saranac Lake, Director of the Sanitarium, I found that the very short straight rod-forms generally corresponded to cases that were manifestly running to a fatal termination. I also came to the conclusion that the long forms, made up of short rods or joints, indicated the same serious vital condition; while the long, smooth, homogeneous rods of straight or curved outline were, in general, characteristic of cases in excellent physiological condition.

The sputa of some patients were remarkable in the richness of spore-formation in the bacilli; this appeared to be particularly marked in old cases that were holding their own well against the disease.

It is a familiar fact that bacteria of any kind, when stained by aniline dyes, rapidly lose their color on the addition of an acid, and it is probably commonly believed that the distinctive micro-chemical character of the tubercle bacillus is a resistance to this decolorizing action of acids, the explanation being the slow diffusion of stain and acid through the body of the bacillus. This belief and explanation cannot be correct, for I found that when the stained bacilli were treated with acid while watched under the microscope, they would almost immediately lose their color as did the non-pathogenic forms. But when the acid was in turn washed away by irrigation with water, the color would return to the tubercle bacilli, provided the action of the acid had not been too long continued. The same fact may be demonstrated in regard to the epidermis of one's hand: a little eosin solution stains it deeply; acid poured on takes the color out, but this to some extent returns when the acid is washed away with water. Now if, as the facts seem to demonstrate, the vitality of the tubercle bacillus is a variable factor, we might with reason expect that the most virulent forms of bacilli would be present in the worst clinical cases, and the least noxious in those wherein the disease was under control; and, furthermore, we would expect to find the reaction of the bacillary protoplasm to staining dyes to vary with its functional activity or virulence. As a matter of fact, my observations gave reason for the belief that in pure cultures of the tubercle bacilli, when the cultures were fresh and virulent, the stained microbes were more resistant to the action of acids than in the case of similar cultures that had been kept for months and had demonstrably diminished in virulence or had entirely lost it.[1] Correspondingly, though with much less certainty, experiments indicated that in the worst clinical cases the association of staining dye with bacillary protoplasm was more stable than in the milder forms of the disease.

I now come to the all-important question in practical diagnosis. What is the probability of the

[1] For the pure cultures of bacilli I was indebted to the kindness of Dr. Trudeau, to Drs. Councilman and Abbott, of the Johns Hopkins University, and to Prof. Vaughan, of Ann Arbor.

bacillus being demonstrable in the sputa of a given case of tuberculosis? The fact that bacilli are demonstrably present, but owing to their paucity of number are usually overlooked, has already been referred to. It may be admitted, without fear of successful contradiction, that where the bacillus is demonstrated there is tuberculosis. But how far may tuberculosis exist without certain physical signs, or without bacillus-containing sputum? This is an all-important question, for this is the stage of phthisis that is manageable, and there is little doubt that the disease might soon be stamped out if diagnosticated thus early.

For several years I have had under careful observation a case of which I append a brief account:

An athletic man, closely confined to sedentary work for nearly ten years, at the age of thirty, and after some weeks of general malaise, suddenly suffers from hæmoptysis. With care there is apparent recovery, and violent exercise is frequently indulged in and enjoyed. Each succeeding winter, however, brings on a train of distressing subjective symptoms in the form of pleuritic pains and failure of nervous energy. For four years after the hæmoptysis, careful examination of the slight and non-typical expectoration, which was probably not pulmonary in origin, failed to reveal the presence of bacilli. Suddenly, without other symptoms, a slight pulmonary expectoration began, and the presence of tubercle bacilli in the sputa was immediately demonstrated. During all this time, and for three months after the appearance of the bacilli, repeated examinations of the chest by different and competent observers had been made with negative result, except so far as a limited occurrence of those indefinite variations from the typical respiratory murmur that, if considered pathognomonic, would class the great majority of mankind as tuberculous.

Rather suddenly, about four months after the demonstration of bacilli in the sputum, this patient presented manifest moist sounds at both apices, their only precursor having been a slightly prolonged expiration. Only slight loss of weight and deterioration in appearance had marked the course of the disease. There is, I think, good reason for believing that in this patient tuberculous disease antedated the hæmoptysis that occurred four and a half years before the appearance of physical signs in the chest.

Very valuable in this connection are the data recently gathered by a pathologist of New York. His object was to discover whether the tubercle bacillus could be proved to exist in the human body without giving rise to organic disease. He was permitted to make autopsies of persons that had met with sudden death by accident, but who had previously presented no evidence of tuberculous disease. With strictest precautions against contamination, bronchial glands were removed from the subject on the post-mortem table, and extracts from them were injected into living animals. The results were that in a large percentage of cases the animals so treated became tuberculous. Facts like these, aided by a legitimate use of the knowledge we possess concerning the innate protective powers of the living tissues, make it easy to believe that the virus of a disease like tuberculosis may lurk for an indefinite time without objective signs or symptoms, until some untoward change of environment or depression of vitality lights the spark into a blaze that is beyond our power to extinguish.

An exact estimate of the value of sputum examination in the diagnosis of tuberculosis could only be made after careful study of hundreds of phthisical cases kept under observation for months or even years of time. For it cannot be too strongly insisted upon that in a certain percentage of cases the bacilli are in a location unfavorable for expectoration until the pulmonary lesion has taken a special and new direction. Thus, a year ago a woman came to the Sanitarium with manifest physical signs of pulmonary trouble and a personal and family history of tuberculosis. No bacilli were discovered in her sputum. She was dismissed after some months, much improved. To-day she is in Denver; the physical signs have somewhat increased, but still no bacilli are to be found.

The data that I have to record were gathered from observations made at the Adirondack Cottage Sanitarium already mentioned. They include only patients submitted to examination with the definite objects set forth in this paper. The Sanitarium is an institution for the *cure* of phthisis, and so far as possible admission is restricted to patients in the earlier stages of the disease. As a matter of fact, however, humanitarian impulses not infrequently allow a person in an advanced stage of the disease to slip in. However, as there is a strong effort made to allow the entrance of only curable cases, we have here a collection of patients in whom, if a fair proportion of bacilli-holding sputa could be detected, the fact would argue very strongly for the diagnostic value of the microbe. Indeed, so well is the restriction on the admission of cases maintained that it would be difficult for an untrained eye to discover that the sojourners at the Sanitarium are a collection of invalids, so well preserved is their nutrition and general physical condition. The whole number of patients observed with reference to the facts detailed was 72. As to sex, they were just evenly divided. As to age, 17 were 20 years old or under; 37 were from 21 to 30 years of age, and 18 between 31 and 40 years. Of the whole number of patients, 5, or a little less than 7 per cent., claimed to have no expectoration. It is significant that all of these were women, and with one exception their ages ranged

from 25 to 37 years. A certain proportion of the patients expectorated more or less profusely, but microscopic examination, usually several times repeated, failed to discover bacilli in their sputa. This class consisted of 16 persons, or 22 per cent. of the whole number. In all the remaining 51 patients, bacilli were detected with certainty; these form 70.8 per cent. of the number, or more than 75 per cent. of the number expectorating.

An analysis of these cases according to their physical and rational signs is not without interest. Of the 21 cases in which no bacilli were found, all were in excellent condition in regard to nutrition and the enjoyment of life, with the exception of one, who suffered and soon died from intercurrent Bright's disease; the remaining 20 were alive and comparatively well when last heard from. Five of the 21 had rather extensive physical signs, while 9 of the remaining 16 had signs of disease so faintly marked that they could with difficulty be detected. Two of the number whom I found without bacilli were said in times past to have had the microbe demonstrated in their sputa by other observers. Of the 51 patients in whom the bacilli could be demonstrated, 18 were manifestly in a decidedly bad way—in fact, 15 of these, or nearly 30 per cent. of the 51 having bacillary sputa, are known to have died since these records were made. This leads to the conclusion that when phthisis is fatal it is tuberculosis, with tubercle bacilli in the sputum. Twenty-one of the 50 bacilli-expectorators were in a serious clinical condition, but holding their own against the disease, and a large proportion were capable of considerable physical exercise or useful employment. Finally, 12, or more than 23 per cent. of the 51, might be described as in excellent condition, and would be considered healthy persons in any average community. The history of a number of those in this last class would be an interesting exhibition of how in phthisical cases environment may bring about rapid improvement or serious deterioration.

As already remarked, two patients, in the sputa of whom bacilli were wanting, were said previously to have had the bacilli present. During my own observations, lasting over some eight months, I found the bacilli to disappear in but two cases, though slight physical signs still remained, while in two others the germs were found in a second search after having been overlooked on the first occasion.

To sum up, out of 72 cases of pulmonary phthisis, more than 55, or 76 per cent., were in such good general condition that their invalidism would hardly have been noticed in an ordinary community. Tubercle bacilli were demonstrated in the sputa of 51, or 70.8 per cent. of the whole number.

In conclusion, I beg to offer a practical remark with regard to prophylaxis. If we take it as proved, that tuberculosis is infectious, and that the agent of infection is the bacillus contained in the sputum expectorated, it needs no discussion to show that the utmost care must be used to render innocuous the matter expectorated from the lungs of consumptives. It is practically impossible to make the safeguards absolute, for no one can prevent an invalid from expectorating on the street, even though æsthetic impulses may render his presence harmless while indoors; but we may draw comfort from an observation recently made by Koch, and quoted in the *Lancet*, that "direct sunlight quickly killed bacteria—the tubercle bacillus for example. Even daylight produces the same effect, though more slowly. Cultivations of tubercle bacilli, propagated for from five to seven days at a window, died." In this way, it is to be hoped, the germ-laden dust of our streets is providentially looked after. Disease germs, like evil, seem to love darkness. Dr. Gibbes has said that he has inoculated animals with tuberculosis by means of a film of dry sputum that he had kept, if I remember rightly, for two years.

The safe disposition of the sputum of consumptives is a matter of such paramount importance to the welfare of every community that of late years many methods have been devised to this end. Undoubtedly the most thorough system having in view the prevention of infection is that recently proposed, I believe, by a Rûssian savant, who seriously suggested that every person suffering from pulmonary phthisis be compelled by law to constantly wear suspended around the neck an elaborate form of spit-cup to receive his expectoration, and which should bear to the patient somewhat the same relation that the nose-bag does to the horse's head.

Much ingenuity has been exercised in devising receptacles for the tuberculous expectoration in the form of simple portable cups, or more or less complicated vessels of glass; but beside the patient's æsthetic objection to using them there is the much more cogent difficulty of the uncertainty of completely sterilizing the vessels when out of use. In my opinion, by far the best form of spit-cup is that manufactured from cardboard by the Sanitary Supply Company of New York. The cup is so constructed that it may even be overturned without spilling the contents—a very important feature—and when after a few hours or a day the cup has served its purpose it may be submitted to the action of that most perfect of all disinfectants—fire.

In the Adirondack Sanitarium, guarding the expectoration is carefully insisted on. Patients are warned against swallowing the sputa — probably the usual method of its disposal in polite tuberculous circles; they are cautioned against expectorating in

handkerchiefs, which soon dry and let their dust fly to the winds; and they are forbidden to expectorate from the public veranda; such an act as wilfully expectorating on a floor would be considered hardly less than a crime.

On the other hand, the patient is provided with the small hand spit-cups *ad libitum*, and on the public veranda and in the halls of the Sanitarium much larger paper receptacles of the same pattern are inconspicuously but conveniently placed.

The therapeutics of phthisis embraces a legion of drugs and methods; but to-day, even in the light of the agitation of the past few months, we must agree in believing that only in a system of rigid prophylaxis can we hope to successfully cope with the king of diseases.

BARIUM CHLORIDE FROM A CLINICAL STANDPOINT.

BY JAMES STRATTON CARPENTER, M.D.,
OF POTTSVILLE, PA.

MISS K., aged thirty-one years, has been under my treatment for mitral stenosis, which had been so long neglected by a homœopathic practitioner, under the care of whom she had previously been, that all the resultant congestive conditions of the internal organs that are so liable to ensue in the course of an untreated lesion of that character had been produced. Her condition at the time I was first consulted, some six months ago, was as follows: The patient was of slight build, of sallow complexion, with puffiness of the eyelids, and presented a typical, anæmic appearance. Auscultation of the chest yielded negative results. The respiratory murmur was but feebly heard; no râles or other abnormal sounds were elicited; it seemed as if the enfeeblement of the respiratory sound was due to deficient expansive power of the chest, which was narrow and contracted, rather than to any direct diseased condition. The heart's action was rapid, its frequency almost uncountable, with nearly complete absence of the first sound. The heart beat not less than 160 times per minute, while the pulse taken at the wrist was so thready as to be almost indistinguishable. There was heard a presystolic murmur, traceable backward to the angle of the scapula, but loudest at the apex. Among the subjective symptoms, particularly referable to the pulmonary and cardiac circulation, were cough and dyspnœa on the slightest exertion; palpitation, frequent and distressing, occurring independently of exertion; pain of intolerable character, described as lancinating, located in the cardiac area, extending also through the chest antero-posteriorly from sternum to interscapular region. Dyspeptic symptoms were prominent. Renal congestion was shown by frequent micturition, particularly troublesome at night, rhachialgia and scanty secretion. The bowels were inactive. The entire system thus loudly attested to some fundamental disturbance that, under "symptomatic treatment," had been altogether undiscovered and unprovided for.

Under a strict dietary, and with medical treatment, a pronounced improvement was made in the gastric and renal conditions; irritability was altogether overcome; the puffiness under the eyes disappeared; the color improved; and a marked lessening of the many nervous symptoms which had been so distressing to the patient was effected. The unsatisfactory results, however, from remedies directed to the regulation of the cardiac action was highly disappointing. While the relief of the dyspeptic phenomena obtained from a milk diet faithfully adhered to for several months had, it is true, lessened the frequency of the attacks of palpitation and the intensity of pain dependent upon the catarrhal gastritis, but little influence was exerted upon the cardiac condition. The pulse continued at just as rapid a rate and remained just as thready, notwithstanding the administration of digitalis, persisted in for some weeks. Tincture of strophanthus, in increasing doses, was substituted, but in no way lessened the unruly heart-action, which may be best illustrated by recalling the experiment of section of the inhibitory nerve of a rabbit's heart, yearly demonstrated before the medical classes by the professors of physiology; so, in this case, it seemed a clear instance of "runaway heart," that neither of the two recognized cardiac medicines could bring under control. These remedies having so utterly failed in influencing the disordered action of the heart, where was there hope of obtaining a remedy through the general system? The failure of strychnine to influence in any degree the cardiac ganglia seemed to close the door against further trial in that direction.

At this time when, in lieu of a better drug, I had again resorted to digitalis, it occurred to me to make trial of the chloride of barium, which had been highly lauded in THE MEDICAL NEWS, by Dr. Hobart A. Hare, as a cardiac medicine, and as an excellent substitute for digitalis, by its action increasing the diastolic pause while it strengthened the systole—the very object sought in the present instance. I had employed the salt once before in a case of irritable heart of purely functional character, administering it in two-grain doses, three times a day, without the slightest effect upon the distressing palpitation from which the young lady suffered. In a second case it was administered in five-grain doses, three times a day, the patient being an old man in the second stage of pneumonitis; in him heart failure was threatening. Not the least untoward effect upon the system was noted, the irregular heart-action being brought under full control.

In the present case I considered myself perfectly safe in commencing the use of the chloride in the dose of gr. 1.6, three times a day, but my experience was such that in future I shall consider it a far safer plan to begin with a much smaller dose, a half fluid-drachm of a one per cent. solution, as recommended by Professor Hare, as being the more prudent method of administration, as the sequel shows.

About ten o'clock in the evening of March 14th, I was hurriedly summoned to my patient, with the message that "she had been taken very sick." The barium chloride had been begun that day, and, as the message was so imperative, I permitted no time to be lost in answering the summons. On entering

the sick-room I found my patient presenting most alarming symptoms, the result of a gastro-enteritis, which, with all the distressing features, was more than eclipsed by the terribly depressant effects of the barium salt upon the heart. The pulse was scarcely definable at the wrist, coming in a feeble intermittent wave, and recording but 26 beats per minute! Auscultation revealed the heart acting tumultuously, with a heaving character, at if there were not enough blood obtainable to keep it in motion; its efforts to contract upon the almost fatally diminished volume of life-fluid were as 4:1 in the ratio of heart-action to radial pulsation. The patient presented a ghastly appearance. The face was deathly pale; the eyes were sunken, the lips of purplish color; the extremities were icy cold; even respiration was almost *nil*, and it required constant demands upon the patient to keep up the needed respiratory function, which, like that of the heart, was overwhelmed by the depressant effect of the chloride of barium. While awaiting the much-needed stimulants for which I had sent, even brandy not being available in this temperance stronghold, I thought each minute the smouldering vital spark would die out altogether. The intense abdominal pain complained of necessitated quick relief, and gr. $\frac{1}{4}$ of morphine, with gr. $\frac{1}{150}$ of atropine, was given hypodermatically, a larger dose under the circumstances not seeming justifiable. Previously to my arrival the patient had been vomiting and purging; after my coming, she was, at short intervals, seized with violent retching, there being no longer anything in the stomach; these efforts were followed by prolonged fainting attacks, from each of which I feared she would not rally. Treatment for shock was in the meanwhile being carried out to the fullest extent possible. External heat, frictions, ammonia inhalations were persisted in until the whiskey and carbonate of ammonia were obtained, when hypodermatics of the former were given at frequent intervals, the latter being administered by the mouth in five-grain doses every hour. For fully four hours I worked unceasingly on this plan, until the alarming condition began to yield and a little more regular heart-action was obtained. The respiratory function still needed considerable stimulation, and I finally left the house, giving strict injunctions not to let the patient sleep until I should have made my visit that morning, since, from the very beginning of the toxic symptoms, there had been almost uncontrollable drowsiness; and, if the patient were permitted to desist from voluntary respiratory effort, respiration would cease altogether, and stupor supervene, to overcome which would require unusual effort. I noted, also, that when the breathing was kept up, the heart's action would show a tendency to improvement; but with cessation of the respiratory act the radial pulse would fade entirely, the heaving action of the heart being for the time the only evidence of vital function.

At my next visit the condition of the patient was much improved, and, beyond a tendency to faintness when the head was elevated, there was little to recall the terrible experience of the previous night. I then obtained the following account of the events of the preceding day. The patient had taken two doses of the barium salt with no unpleasant result, stating that the medicine produced a feeling of drowsiness, so that for the first time in weeks she was able to obtain refreshing sleep during the afternoon. About six o'clock she took a teaspoonful of pulvis glycyrrhizæ compositus to overcome a constipation of several days' duration. The first unpleasant effects then showed themselves; she began to be sick at the stomach; there was profuse purgation, accompanied by severe pain of a burning character. At eight o'clock she took the third dose of barium chloride; an hour later the symptoms were so distressing that she called for assistance, the family having retired early that night. Even then the nature of the trouble was not suspected either by the patient herself or by her family; she attributed the disturbance to the effects of the laxative powder, which had at times acted somewhat similarly, and it was only when the vomiting and purging began to be uncontrollable and were followed by attacks of fainting that the family became sufficiently alarmed to send for medical aid.

Convalescence was undisturbed by anything unpleasant. The patient was confined to bed for one week. The diet was milk; the carbonate of ammonia and brandy were continued for several days, until the tendency to faintness already mentioned was overcome. The heart's action, which had been reduced during the attack to an extremely low rate, steadily improved, and, while the patient kept in bed, was full and regular, and did not exceed 84 beats per minute. After she was out of bed this was somewhat increased to about 100 per minute, but the pulse preserved its fulness and regularity. As soon as she resumed her household duties, I put her on the barium preparation in doses of a half fluid-drachm of a one per cent. solution, increasing the dose gradually until she is now taking two fluid-drachms of the solution, or nearly the same dose as that with which I began the administration, but with far more comfort to both patient and physician. She visited me recently at my office, and was in excellent condition of health, saying that she "never felt better in her life." She eats and sleeps well, suffers no pain about the heart, and attacks of palpitation have only occurred when she has omitted taking her medicine as directed.

In connection with this case I have made the following observations:

1. Barium chloride is a powerful irritant poison, of somewhat unreliable character when used medicinally. While I have administered it in two-grain doses without result, and, as in the case cited, it has been given in as large a dose as five grains, t. i. d., without causing any irritating effect, in the present instance the administration of less than two grains, three times daily, was productive of nearly fatal poisoning.

2. While barium chloride undoubtedly exercises a highly beneficial action in certain cases of cardiac derangement that may not yield to either digitalis

or strophanthus, it must be remembered that it is powerfully depressant to the heart; its administration should, therefore, be begun with the smallest dose consistent with the demands of the case, half a fluidrachm of a one per cent. solution being advisable as the initial dose, to be increased as required.

3. In toxic doses, barium chloride would seem to be not only a corrosive poison and a depressant to the action of the heart, but threatening to life by its effect upon respiration as well. In the present case the similarity of the respiratory phenomena noted to those presented in opium narcosis will have been remarked. Two possible occurrences must, therefore, be eliminated, viz.: Was there opium-poisoning present, either as a result of self-administration of the drug, or as a result of the hypodermatic use of gr. ⅛ of morphine sulphate that I gave the patient soon after my arrival? The first possibility, either as an accidental occurrence or otherwise, is negatived by the testimony of the patient herself to that effect. On the second point, I think that not only is the history of the case sufficiently convincing to the contrary, but very few would maintain that such overwhelming effects of the drug could result from so small a dose of morphine, even when given under the conditions that existed. While I gave it with some misgivings, owing to the desperate condition of the patient, her intense suffering necessitated its administration; as it proved almost immediately beneficial, not only in allaying the violent pain but also in quieting the distressing retching, which demanded quick relief, I could but consider it entirely justifiable. The following considerations, however, fully warrant the belief that opium-narcosis was *not* present as a factor in the history of this case:

(*a*) The absence of the "pin-hole" condition of the pupils, which should have been present were toxic effects of morphine produced. The pupils were only moderately contracted, and sensible to the light test.

(*b*) The same condition of respiratory failure was present *prior to* the administration of the morphine as was noted *subsequently* to its use.

Has, then, the chloride of barium a direct depressant action upon the respiration, or was the condition noted due to the secondary effects of the barium salt—the cerebral congestion dependent on cardiac failure?

4. In the employment of chloride of barium, the possible influence of purgative medicine should be borne in mind. Whether or not the drachm dose of the licorice powder had any effect in the production of the unpleasant conditions described in the present paper, I do not pretend to say; but, as barium chloride is irritating to the mucous membrane, the conjoined administration of purgatives should at least be followed by careful observation. I have recently used barium chloride in another case of heart disease, in which both mitral and tricuspid valves are chronically diseased, employing the minimum dose, but was obliged to discontinue its use on account of its irritating effect upon the bowels.

A KNIFE-BLADE FOUND IN THE BRAIN YEARS AFTER ITS ENTRANCE, DEATH RESULTING FROM OTHER CAUSES.

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THE unexpected finding of a knife-blade, firmly imbedded in the skull, and penetrating the brain to the depth of one inch, would seem of sufficiently rare occurrence to warrant the reporting of the case. The interest is heightened by the fact that the knife-blade had been where it was found for a number of years, without giving rise to the slightest symptom.

C. Capsule turned back from knife-blade. D. Adherent dura.

On the evening of February 12, 1890, a man was brought into the City Hospital, Brooklyn, by the ambulance surgeon, suffering from several bullet-wounds. One ball was lodged in the left thigh, another had passed through the same thigh at about its middle, while the third and fatal ball entered the abdomen on a line with the umbilicus, and about two inches to the left of it. When admitted, the man was suffering from profound shock, but, improving during the night, he was operated on in the morning, and the intestines, perforated in a number of places, were sutured. The wound was placed in the best possible condition, but, with all the precautions taken, the man died of general septic peritonitis on the evening of the 14th.

As it was a coroner's case, an autopsy was held the next day at 2 P.M. On removing the brain, I felt a

sharp projecting point in the posterior fossa, on the left side. At first, I thought that this was one of the so-called ivory exostoses, but, on dissecting the scalp away from the outer surface of the skull, I found a foreign body of some kind that had penetrated the skull. A close examination of the scalp was now made without finding evidence of any wound, recent or old. The section of skull shown in the cut was then removed, and I found part of a knife-blade, $\frac{5}{16}$ of an inch in width, projecting into the brain to the depth of one inch. It had entered the skull about 3¾ inches posteriorly to the left external auditory meatus, in the line of the occipito-parietal suture, penetrating the lower posterior portion of the occipital lobe. The point of the blade was ensheathed in a strong fibrous capsule, about half an inch thick, that was adherent to the brain and its membranes by old and firm adhesions. The brain in the neighborhood was apparently normal, save a very slight thickening of its membranes in the immediate vicinity of the knife-blade. The blade was black and corroded, and everything pointed to the fact that it had been in its position for a number of years. There was no depression or displacement of the bone, and the blade had evidently passed between the sutures, probably in boyhood, when the bones were softer, and the sutures not as firmly interlocked as in the specimen when removed. The knife-blade had been broken just on a level with the external surface of the skull, and the man never knew the extent of the injury, as he enjoyed the best of health up to the time he was shot.

After the autopsy I set about trying to learn just how long before his death the injury had occurred. From his wife and mother I learned that, to the best of their knowledge, he had never received any injury of a serious nature. He had always enjoyed good health, never having had even a headache, had always been in good spirits, and was considered an able-bodied workman at his trade, that of a plumber.

There are a few authentic cases on record of persons living for a longer or shorter time with foreign bodies in their brains. In the larger percentage of cases the foreign bodies were bullets, and in most of the reported cases these, sooner or later, caused the death of the victim. O. Callaghan reports the case of an officer who lived seven years with the breech of a gun, weighing three ounces, lodged in his brain (Erichsen's *Surgery*, vol. i. p. 728).

In the *Annual of the Universal Medical Sciences*, 1888 (vol. ii. pp. 299–301), in addition to a number of cases of bullet-wounds, there are reported two cases somewhat similar to that of mine. One case was reported by Dr. Wilson, in which a copper paper-file penetrated the right side of the occipital bone, near its junction with the petrous portion of the temporal bone, and passed for more than three inches into the brain; profound collapse, with stertorous breathing, followed, but the subsequent recovery was complete. H. C. Dalton reports a case of punctured wound of the brain, in which a knife-blade entered the temple three-quarters of an inch behind the external canthus of the right eye, and penetrated fully two inches. There seems to be no doubt that the knife-blade penetrated the brain. No explorations were made; antiseptic dressings and ice-bags were applied to the head, and purgatives and morphine were given. The recovery was slow, but was considered complete.

The instruments used in the cases reported probably did no more damage to the brain-substance than would the exploring-needle that many surgeons use. Moreover, the fact that the foreign bodies did not remain in the brain very materially lessened the gravity of the case. In my case we have the following prominent facts that make it of more than usual interest: 1. The wound was so slight as to escape notice when inflicted, and, from all I could learn, received no treatment, not even rest; 2. It gave rise to no symptoms whatever during the life of the patient; 3. The man was about thirty years old, and, in all probability, the blade had been in the location in which it was found for a number of years.

I think this case argues in favor of the treatment recommended by some authorities for penetrating wounds of the brain, *i. e.*, immediate cleansing of the wound and placing it in an aseptic condition—closing the wound without attempting to explore or remove the foreign body. In the war of Tonkin and Formosa this treatment was followed by a mortality of only 10 per cent. as contrasted with 60 per cent. in the war of the American Rebellion, in which all wounds were explored and attempts made to remove the foreign body.

The specimen from which the drawing was made is now in the museum of the Hoagland Laboratory, Brooklyn, N. Y.

ORIGINAL LECTURE.

THE HEART: ITS MURMURS, THEIR DIAGNOSIS AND TREATMENT, AND THE ACTION OF THE CARDIAC TONICS AS A CLASS.[1]

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LECTURE III.

GENTLEMEN: In the two preceding lectures we have carefully studied the various ways in which valvular lesions and cardiac murmurs are produced; also the methods at our command for accurately diagnosticating these conditions.

When we go over the chest of every patient in a regu-

[1] A series of lectures delivered at the New York Post-Graduate Medical School and Hospital.

lar and systematic manner—studying first the mitral indirect and direct areas, then the aortic indirect and direct, and determining as to the presence or absence of abnormal sounds, and the direction of transmission when present, in accordance with the rules already laid down—we are able to determine with positive accuracy whether murmurs are present or not.

From the result of this examination, plus the clinical history of the case, we are able to determine the character of the lesion or lesions in consequence of which the abnormal sound or sounds are produced.

By this method we can distinguish four murmurs almost as easily as we can detect a single and isolated sound. In fact, we are simply dealing with a single murmur at a time, although the final result of our observations may be the detection of double murmurs, both at the mitral and aortic orifices.

Having acquired this degree of skill in diagnosis, and with it having learned to recognize the exact pathological lesion present, we are placed in a much better position to consider the physiological and therapeutic action of the drugs that may be used to assist nature in compensating for the pathological and mechanical deficiencies of the heart, and thereby maintain the physiological and nutritive conditions of the system at large.

At this point, however, it must be assumed that nature has already subdued or removed from the system the infectious element that caused the endarterial or endocardial irritation, and that we have to deal with the cardiac murmur and the established lesion purely as a mechanical defect, which is to a degree stationary in character. Granting this, we can understandingly discuss the comparative merits of that class of remedies commonly regarded as cardiants.

It can further be asserted that, by augmenting the nutritive activity of the heart and increasing its working capacity to a degree related to the simple mechanical defect, the individual will be placed in a thoroughly good condition—in other words, in a normal state, so far as the action of the heart from a mechanical point of view is concerned. Physiologically, of course, there is always a certain degree of compensatory hypertrophy and some over-distention of one or more of the cavities of the heart, as well as a localized vascular engorgement at some point of the circulatory apparatus. This increased compensatory action of the heart prevents any material embarrassment in the workings of the physiological economy. If, however, at any time such an individual should be seized with an infectious disease, his nutrition, from any cause, becoming impaired, the vitality of the cardiac muscle will be rapidly reduced and the compensatory condition deranged to such a degree that the mechanical action of the heart will be seriously interfered with. Under such circumstances the prognosis is much graver than it would be in the absence of a cardiac lesion, even though the acute or infectious disease *per se* be comparatively mild in character.

Before proceeding further, it is necessary to formulate a standard by which the terms commonly employed, such as cardiac sedatives, depressants, stimulants and tonics are to be applied. By limiting the use of these terms much confusion can be avoided. By keeping strictly within sharply defined limitations there can be no question as to the exact action and the result to be obtained from the administration of one or more of these drugs.

1. *A cardiac sedative* is best defined as a drug or remedy that tends to stimulate a depressed, or quiet an irritable nervous system, so that it will assume a more perfect and uniform action, and in this way ultimately increase, as it were, the general innervating and inhibitory power of the entire nervous mechanism, thereby inducing a more even and harmonious performance of all the bodily functions. When this result has been accomplished, a heart, previously acting in a tumultuous and irregular manner, will be found to have resumed a normal and rhythmical action; whatever distressing symptoms may have been present as the result of the abnormal movements of the heart, will have been quickly dissipated.

The salts of bromine are probably the best examples of this kind of drug. They are often found to be of great service in regulating the tumultuous action of the heart in hyperæsthetic subjects. They are, however, of no avail when a truly mechanical defect, either functional or organic, has been developed.

2. *A cardiac depressant* is best defined as a drug that will at once and perceptibly depress both the force and the frequency of the action of the heart. This result is brought about by a direct influence upon the heart-muscle or secondarily through the nervous system.

This class is best represented by aconite, veratrum viride, and the vegetable acids. All the nitrates, nitrites, and potassium salts may be placed in this group, together with nitro-glycerin, amyl nitrite, etc. The last two and the potassium salts may be of great service in regulating a tumultuous and laboring heart in that class of cases in which an abnormally high tension in the arteries is causing an undue amount of resistance to the onward flow of the blood. In so much as the abnormally high tension is a causative factor in embarrassing the action of the heart, its diminution will seem to have stimulated and regulated the rhythm of the heart, although no direct or intrinsic action has been produced upon the heart or the nerve-centres that directly govern its movements.

3. *A cardiac stimulant* is best defined as a drug or remedy that calls into action the intrinsic or stored-up motor power of the cardiac muscle, but without directly affecting its nutritive condition. This result is brought about either by a direct influence upon the muscle-fibres through the intrinsic cardiac ganglia or by an extrinsic action originating in the cardiac centre of the medulla and transmitted through the centrifugal nerves to the heart-muscle.

The most typical example of this kind of stimulating action upon the heart is illustrated by the application of a high degree of dry heat to the integument directly over the præcordial area. By this application, without supplying any new substance to the system, the cardiac muscle is made to do more work simply by a reflex action transmitted to the heart through its nervous mechanism, the inherent vital or stored-up motor power of the cardiac muscle is called into more vigorous and effective action. So far as the work accomplished is concerned, this is equivalent to stimulation.

Owing, however, to the fact that neither the nutritive

condition of the system at large nor that of the heart in particular is augmented, this increased action of the heart, if continued, will soon result in deterioration of the cardiac muscle, equivalent to a poisonous action upon the muscle-fibres. In this instance the damage is brought about in a simple manner, as the result of increased muscular work without an equivalent increase in the nutritive supply.

The majority of drugs that belong to this class, excepting alcohol, are glucosides. As a rule, the cardiac stimulants are compounds of CHO that cannot be oxidized within the system to form nitrogenous elements; consequently they are non-nutritious. They are rapidly converted into carbon dioxide and water, during the process of which energy and heat are evolved, and, as it were, a reflex irritation is brought to bear upon the nervous system and heart. In this manner the working power of the cardiac muscle is temporarily augmented, but at the same time its nutrition is diminished; as a result, brought about either directly or indirectly, the muscle-tissue is poisoned, so that ultimately its vitality is greatly reduced, if not absolutely destroyed.

A few of the drugs in this group are toxic alkaloids, containing nitrogen. While theoretically capable, in the cycle of changes in the body, of being oxidized into the final products, urea, carbon dioxide and water, they are, nevertheless, poisonous, like many other proteid bodies, such as the toxic ptomaïnes and leucomaïnes. In passing through the system, these substances appear to have the property of temporarily exciting the heart-muscle to more vigorous action, but the result is transient and is rapidly followed by a decidedly poisonous action upon the muscle tissue proper.

4. *A cardiac tonic* is best defined as a drug or remedy that acts upon the heart intrinsically or extrinsically (usually in the latter way), or by a combination of the two; its ultimate result is the development of a higher degree of muscle power by the formation of an increased volume of muscle protoplasm, and not alone by simply calling into action stored motor power at the expense of the vitality of the muscular elements.

This class of remedies is represented by the drugs containing CHNO, such as caffeine, morphine, strychnine and atropine, and by the food-stuffs containing CHNOS, all of which are capable of being changed or oxidized within the system. In passing through the economy, these nitrogenous bodies aid in forming body-tissue, and are finally converted into the ultimate products of tissue-waste and excreted as urea, carbon dioxide and water. Cardiac tonics must first pass through a cycle of changes in the body that result in the formation of all sorts of proteid compounds, or, at least, these medicinal agents most positively retard the retrograde metamorphosis, despite the increased work. At this point it may be well to state that, although the atomic composition of these drugs will not warrant the supposition that in the small quantities in which they are used they are equal in tissue-forming power to the proteid substances taken as food, there is much clinical evidence of a positive kind which seems to prove that, while they do not constitute the most perfect food-stuffs and tissue-forming elements in passing through the cycle of change from their introduction to their excretion as urea, carbon dioxide and water, they do have a most wonderful power in developing and maintaining the nutritive vitality of the proteid elements of the various body-tissues and organs. To more completely illustrate this subject, the accompanying table has been prepared. This shows at a glance the active principles of the different drugs, their chemical composition, and their comparative actions and merits most clearly.

In defining the different classes of drugs, sufficient has already been said to indicate where the sedative and depressant cardiants can be used to advantage in the treatment of affections of the heart; consequently the drugs of those two groups will not be individually considered. We will pass directly to the study of the stimulants and tonics.

In the class of stimulants containing CHO, alcohol unquestionably stands first. The action of alcohol upon the heart can be summarized as follows: As a result of its oxidization within the system into its final excretory products, carbon dioxide and water, energy is rapidly evolved, by which the heart is influenced, either directly or reflexly through its nervous mechanism, in such a manner that the inherent working-power of the cardiac muscle is greatly augmented. Owing, however, to the chemical fact that the CHO elements that form the alcoholic compound are not capable of transformation by the physiological economy into nitrogenous substances, neither the body at large, nor the heart-muscle in particular, can, by the intrinsic influence of this agent, be directly improved in their nutritive functions. But as a result of the development of this new energy by the rapid oxidization of the alcohol, the nervous mechanism of the body is influenced in such a way that the action of the heart becomes stronger and the arterioles in general moderately dilated, so that a larger volume of blood is driven more slowly through the capillary system. If at the same time a sufficient quantity of proteid material is introduced into the nutritive channels, the modification in the movements of the heart, together with the moderately dilated condition of the arterioles, necessarily causes a larger volume of more highly nutritive blood to flow through the arterial capillaries in a given space of time; consequently the general nutrition and that of the heart-muscle as well is greatly improved. By this indirect and secondary influence alcohol may be looked upon as both a stimulant and a tonic to the heart. The latter term, however, is not justly attributable to the action of the alcohol alone, for the evident reason that when a patient is restricted to an alcoholic diet, or takes alcohol in large quantities, or to the extent that the digestion and assimilation of proteids is impeded, or the oxygenating capacity is overtaxed, a positively deteriorated condition of the system is at once induced.

To completely understand the increase and decrease of nutrition, either local or general, a clear conception of the methods by which Nature governs this physiological problem is absolutely essential. Briefly stated, it is as follows: that all nutritive interchange between the blood and perivascular tissue is effected through the *arterial capillaries;* that when the blood has passed this point and entered the intermediate and venous capillaries, all the nutritive interchange is practically at an end; that normally a given volume of blood, having a certain quality when passing at a definite rate of speed through the arterial capillaries with a given tension, will allow

CARDIAC STIMULANTS.

Drug.	Active principle.	Its form and formulæ.	Solubility in Water.	Solubility in Alcohol.	Action on the rapidity and muscular power of the heart.	Action upon the small bloodvessels, arterioles and capillaries.	Action as a diuretic.
Alcohol . . .	Alcohol.	C_2H_6O	.....	.....	Increases the working capacity; slows a rapid, increases a slow heart; muscle secondarily exhausted.	Slightly contracts the general arterioles; dilates splenic arcade; nutritive tone improved.	Slightly diuretic.
Digitalis . . .	Digitoxin.	$C_{21}H_{32}O_7$	Insoluble.	Sparingly.	Shortens systole; lengthens diastole; slows action of heart; increases muscle power, then poisons the muscle.	Vessels highly contracted in general; dilates splenic arcade; nutritive tone diminished.	With venous congestion, are good diuretics.
	Digitalin.	Glucoside $C_5H_8O_2$	Nearly insoluble.	Readily.	Shortens systole; lengthens diastole; slows action of heart; increases muscle power, then poisons the muscle.	Vessels highly contracted in general; dilates splenic arcade; nutritive tone diminished.	
	Digitalein.	Glucoside $C_{25}H_{40}O_{25}$	Freely soluble	Readily.	Shortens systole; lengthens diastole; slows action of heart; increases muscle power, then poisons the muscle.	Vessels highly contracted in general; dilates splenic arcade; nutritive tone diminished.	
	Digitonin.	Glucoside $C_{21}H_{60}O_{17}$	Readily soluble.	Sparingly.	Lengthens systole; shortens diastole; antagonizes digitoxin, digitalin, and digitalein, and poisons the muscle.	General arterial system and splenic arcade dilated; nutritive tone diminished.	Not diuretic.
	Digitin.	Glucoside . . .	.....	.....	No special action known.	No special action.	No action.
Convallaria . .	Convallamarin.	Glucoside $C_{28}H_{44}O_{11}$	Soluble.	Soluble.	Increases the length and force of the systole; slows action of heart, and poisons the muscle.	Arterioles dilated; increase of tension is due to increased heart-power.	Evidence contradictory.
	Convallarin.	Glucoside $C_{34}H_{62}O_{11}$	Insoluble.	Soluble.	No action on the heart; is somewhat purgative in action.	Not used to act on vessels; if it exerts action, it lowers tension.	No use.
Strophanthus . .	Strophanthin.	Crystalline glucoside $C_{24}H_{34}O_{10}$	Soluble.	Soluble.	Lenthens systole; shortens diastole; slows action of heart; increases muscle power, then poisons the muscle.	Tension primarily unaffected; may be raised by increased heart-power.	May be diuretic by improving the heart, but not primarily.
	Strophanthadin	Glucoside . . .	Insoluble.	Insoluble.	Inert so far as known.	Tension primarily unaffected; may be raised by increased heart-power.	
	Ineine. (?)	Alkaloid	.....	.....	Action given the same as that for strophanthin.	Tension primarily unaffected; may be raised by increased heart-power.	
	Strophantine(?)	Toxic alkaloid . .	Soluble.	Soluble.	Action given the same as that for strophanthin, but more poisonous to the muscle protoplasm.	Probably lowers tension; evidence uncertain.	Not diuretic.
Scoparius or Broom . .	Scoparin.	Neutral body $C_{21}H_{22}O_{10}$	Soluble.	.....	Exact action uncertain; possibly diuretic in nature.	.....	Not clearly stated.
	Sparteine.	Liquid alkaloid $C_{15}H_{26}N_2$	Insoluble.	Soluble.	Slows action; lengthens and increases force of the systole; shortens diastole; poisons the muscle tissue.	Contracts arterioles in general and in splenic arcade; nutritive tone diminished.	Not diuretic.
Adonis vernalis	Adonidin.	Glucoside . . .	Soluble.	.....	Action almost identical with that of digitoxin, but ten times more poisonous to muscle tissue.	Slight contraction of systemic arterioles; those in splenic arcade dilated.	Slightly diuretic.

CARDIAC TONICS.

Drug.	Active principle.	Its form and formulæ.	Solubility in Water.	Solubility in Alcohol.	Action on the rapidity and muscular power of the heart.	Action upon the small bloodvessels, arterioles and capillaries.	Action as a diuretic.
Ammonium . .	Ammonia.	Carbonate $N_2H_{11}C_2O_6$	Soluble.	Soluble.	Increases working capacity; slows a rapid and increases a slow heart; muscle not poisoned.	Slightly contracts arterioles in general and tends to produce normal tone.	Slightly diuretic.
Caffea	Caffeine.	Alkaloid $C_8H_{10}N_4O_2H_2O$	Sparingly soluble.	Sparingly.	Increases the force and frequency of muscular contraction; lengthens systole; muscle tissue nourished.	Contracts arterioles in general, but dilates those in splenic arcade; nutritive tone improved.	Markedly diuretic.
Nux vomica . .	Strychnine.	Alkaloid $C_{21}H_{22}N_2O_2$	Soluble.	Soluble.	Increases the force and frequency of the muscular contraction; systole lengthened; muscle unpoisoned.	Slightly contracts arterioles in general, but dilates splenic arcade; nutritive tone improved.	Slightly diuretic.
	Brucine.	Alkaloid $C_{23}H_{26}N_2O_4$	.....	.....	Same as of strychnine, but weaker in power.		
Belladonna . .	Atropine.	Alkaloid $C_{17}H_{23}NO_3$	Soluble.	Soluble.	Increases the force and frequency of the muscular contraction; muscle unpoisoned.	Marked contraction, including splenic arcade; nutritive tone decreased.	Not diuretic.
Opium	Morphine and sixteen other alkaloids.	Alkaloid $C_{17}H_{19}NO_3H_2O$	Soluble.	Soluble.	Slows a rapid and increases a slow heart; muscle power increased; systole lengthened; diastole prolonged, and muscular tissue nourished.	When vessels dilated causes contraction; when vessel contracted, causes dilation; general regulator.	Slightly diuretic.

of an interchange between the blood and tissue which is equivalent to the work accomplished, thus exactly repairing the loss resulting from the tissue or glandular work performed.

An unduly high or low arterial tension will so change the speed of the blood in these nutritive capillaries, that even should the quality of the blood remain the same the nutrition will fall below the normal standard. The high tension is the more dangerous of the two, for when general the blood passes so rapidly beyond the nutritive point that the system as a whole is, as it were, starved to death. This assertion is most beautifully illustrated by those cases reported of speedy death induced by the continued high tension that followed the uninterrupted administration of powdered digitalis;[1] also in the condition known as shock, in which the great bulk of the blood suddenly passes to the venous side of the circulation—this being now recognized as the chief pathological factor to be overcome in the treatment of that condition.

When the arterial tension is abnormally low, the disturbance in the nutritive function is not so quickly noted, and for a time it is even increased, but in both instances it is ultimately impaired until, finally, the glandular activity of the body is diminished and the nutritive quality of the blood very decidedly reduced. A thorough understanding of this physiological law helps to clearly explain many actions that follow the introduction of medicinal agents into the system. By taking advantage of this law and lowering or raising the tension, the nutritive processes can often be modified or changed to such a degree that pathological conditions can be dissipated and the part restored to its original standard; or, on the other hand, a normal condition may be converted into a pathological one. When in a perfect physiological condition, the system is continually making this vascular alteration to meet the constant changes in the nutritive quality of the blood and the varying amount of work that is to be performed by the different body-tissues and glands.

Both the high and low tension in the arteries are due to a similar cause, but differing in the degree of its intensity of action. In both the causative influence leads to nervous exhaustion. When the tension is heightened a hyperæsthetic condition of the nervous centres which govern the vaso-constrictors is produced, and, as a result, both normal and pathological influences tend to excite an undue volume of energy and an increased and often irregular innervating impulse is distributed through the vaso-constrictor nerves, thus inducing and maintaining the abnormally high tension. When the tension is lowered the nervous exhaustion is more complete. The normal or pathological irritation is not sufficient to stimulate the vasomotor centre and excite the vaso-innervatory impulses to the arterial wall, and from the loss of this action the contained blood distends the vessels and gives the erroneous impression of the existence of vaso-dilator nerves and influences. At times this exhaustion becomes so great that even the most powerful drugs at our command will not excite innervating impulses, and the patient, of necessity, dies.

In proportion to the quantity taken, alcohol, up to a certain point, has the property of meeting both these conditions, so that in the one case it will lower the tension and improve the heart's action, and in the other it will raise the tension and increase the working capacity of the cardiac muscle. In fact, in all cases in which the use of alcohol is kept strictly within the physiological limit its tendency is to bring the heart's action and the vascular tension to the normal standard or a little above. When alcohol is used within these sharply defined bounds, together with a well-regulated and purely nutritive diet, in the sense of tissue-formation, it is without doubt or question one of the most powerful therapeutic agents for good at the command of the physician. But if the alcohol is used continuously, and especially in excess, yielding as it does only heat and energy while it is rapidly being oxidized into carbon dioxide and water, it has a pronounced tendency to exhaust the oxygenating capacity of the system, and thus prevents a perfect transformation of the proteids, until finally all the functions of the body are decidedly changed, if not completely destroyed. This is most apparent in the nervous system, as evinced by the impaired mental faculty. Alcohol is, therefore, a drug that produces true starvation, and whenever used in excess, either for a short or long period of time, must of necessity alter the nutritive quality of the blood, change the action of the heart and the vascular tension, and ultimately become a potent factor in producing permanent pathological lesions. The quantity of alcohol taken and the degree of disturbance of proteid oxidization, and especially the latter, are the factors that will determine the rapidity with which these abnormal conditions are developed.

The well-known and often-demonstrated rapidity with which all the bodily functions are restored so soon as the excess of alcohol is withheld from the system and in its place the proteids administered and perfectly oxidized, shows quite conclusively that alcohol *per se* has no poisonous effect upon the body, but that it acts as all CHO compounds must when taken in excess. They are all quickly and easily oxidized, thus using up the oxygen taken in by the inspiratory act, leaving an insufficient quantity to accomplish the more difficult and complex act known as proteid oxidization. This naturally results in an incomplete metabolism of these elements and the development of an almost innumerable variety of abnormal and in many instances decidedly poisonous substances. The long list of poisonous ptomaïnes, leucomaïnes and toxines already discovered fully corroborates this assumption. These compounds are not developed out of the CHO substances, but originate directly from the CHNOS elements which have been imperfectly transformed. The varied action of this large number of abnormal and poisonous nitrogenous compounds upon the nervous system and functions of the body in a large measure affords not only a clear but rational explanation of the damaging effects upon the mental faculties which are so often, but erroneously, credited to the direct action of the alcohol. The nervous system, when over-stimulated by this large amount of heat and energy evolved by this sudden oxidization of alcohol, and having for its nutriment these toxic nitrogenous compounds instead of those perfectly formed, cannot work normally, but is of necessity compelled to act in the abnormal manner indicated. The variety of toxic compounds developed also explains the great number of abnormal manifesta-

[1] Oberstabsartzt, Deutsche militärärtztliche Zeitschrift, 1876.

tions that are from time to time developed in different cases and even in the same individual at different times. These facts are applicable to both the acute and chronic cases that have resulted from over-indulgence in alcohol.

Considered from a purely chemico-physiological standpoint, the damaging effects of alcohol upon the system are little if any greater than those that follow the administration of an equal quantity or an over-indulgence in any of the other CHO group of compounds. But owing to the almost instantaneous absorption and the lightning-like transformation of the alcohol into other chemical compounds within the system, its effects are more quickly and positively felt.

This influence, however, is almost as speedily dissipated, and leaves the nervous system in particular in an overworked and poorly nourished condition; in fact, so much exhausted that a growing demand for repeated and increased stimulation is induced to overcome this state of depression. This same condition is induced by all CHO compounds, but reaches its maximum degree in the case of alcohol.

The oxygenating capacity of the system is so speedily taxed by the introduction of alcohol that all the functions of the body are at first greatly augmented, then lowered and modified until finally they become decidedly subnormal. That the damaging effects upon the system which are found in conjunction with the free use of alcohol are not due to the direct influence of the alcohol *per se* upon the blood, tissues and glands, but is the result of the sudden tax upon the oxygenating capacity of the animal economy and the imperfect metabolism of the proteid elements, is certain. This is clearly proved by the elaborate experiments of Dr. Anstie, who found that after keeping a dog super-saturated with alcohol for days, and then introducing into the stomach a considerable quantity of alcohol just prior to killing the animal, the total quantity of alcohol that could be obtained from the dog by distillation of every particle of the animal's tissue, including the bones, hide and hair, was not more than one drachm, although several ounces had been injected into the stomach almost immediately before death. This kind of observation shows quite conclusively that alcohol as such is rapidly dissipated within the system; even when large quantities are taken into the stomach an infinitesimally small quantity is excreted from the body in its original form, C_2H_6O.

One such thorough quantitative experiment as this outweighs in value all the qualitative experiments that can be made with the most sensitive reagents that are capable of detecting minute quantities of alcohol.

Theories based upon the former experiments are sound and are in accord with clinical and pathological knowledge, while those based upon the latter become little less than gross fabrications.

The chief reasons why the cerebral disturbances and damaging effects are not so quickly developed after the introduction of all the other CHO compounds are, that they must first be digested in the alimentary tract and liver—as the grain is transformed in the malting and brewing house—and also that they are much more slowly absorbed by the entero-hepatic circulation in their course to the liver. Even there they are tardily converted into alcoholic compounds, yielding heat and energy, but slowly as compared with alcohol. While it may take twenty-four hours or longer to convert a given quantity of starch and sugar into alcohol and finally into its excretory product, carbon dioxide and water, a much larger quantity of alcohol may be so transformed in a much shorter length of time, possibly in a few minutes. Heat and energy are, however, evolved in both instances; starch, sugar and alcohol all yield the same excrementitious products, but without combining with the nitrogenous food-stuffs to form the proteid tissues of the system.

The starch, sugars and fats, as well as the alcohol, when taken in excess, have a marked tendency to disturb proteid-metabolism; the alcohol most rapidly, because when introduced it is always a stage further advanced in the transition and is capable of being directly oxidized. From this fact, that members of both groups can pervert proteid-oxidization in the same manner, we frequently see as the result of over-indulgence in any or all of the CHO compounds, exclusive of alcohol, disturbances that, when viewed from a purely chemico-physiological standpoint are found to be equally as damaging in their effects upon the system as those that follow the free and excessive use of alcohol. They do not, however, give rise to the striking condition known as intoxication, which makes a human being so revolting to his fellow-men, but they do produce insomnia, hypochondriasis, suicidal mania, and in fact all forms of insane delusions, symptomatic of changes that in their final results are often equally as damaging to the mental faculties and to life as those that follow alcoholic excesses.

When the quantity of alcohol administered is kept within the limits that do not interfere with the complete and perfect oxidization of the proteid compounds, the physiological functions of the body will not be impaired, but often very decidedly augmented. The alcohol, being rapidly oxidized within the system, with a comparatively small expenditure of oxygen, and at the same time yielding a proportionately large amount of heat and energy for the quantity of oxygen used, is found to be capable of maintaining body heat and energy with a small expenditure of vital force. This saving is effected in various ways; one is by sparing nature the necessity of first transforming starch and sugar into alcohol before they can be utilized by the animal economy.

When this process of forming alcohol-like elements has to be performed in the intestine, liver, and blood—instead of taking the alcohol from the malting and brewing house, it necessitates a large expenditure of glandular activity, energy, and the supply of a considerable quantity of oxygen on the part of the system, and even when accomplished the sum-total of heat and energy developed is small in comparison with the results obtained where alcohol is used.

In health, the development of this large amount of heat and energy with the comparatively small expenditure of oxygen and glandular activity is not so desirable and is apt to be carried to excess, but when a diseased process is developed and the system is suddenly overtaxed and its vital force lowered by the introduction of a foreign body, as a germ, ptomaine, leucomaine, or toxine, it becomes necessary to save oxygen and to harbor the vital resources in every way possible, the nutritive vitality may be maintained until the offending

element can be expelled. Under these circumstances, alcohol is of unparalleled service to the system, for by its action oxygen is saved, glandular activity conserved and the necessary expenditure of heat and energy to carry on the secretory and excretory work reduced to the minimum. In fact, there are times when the functions of digestion and absorption are at such a low ebb that nature is compelled to feed upon its own tissues or starve. If alcohol be administered at this time the body-heat and energy may be artificially maintained with a decided saving of oxygen and vital force. By this gain in oxygen, with stimulation of the nervous system, digestion, absorption, and assimilation are sustained, and a larger amount of a more perfect proteid-metabolism is accomplished; the nutrition of the body is improved, its vital energy raised, and its power to resist the inroads of infectious elements brought to the highest possible standard. It also enables nature to more quickly eliminate these poisons, thereby shortening the duration and diminishing the intensity of the pathological processes, thus often saving a life that without its use must be lost. It is by this same saving of oxygen, this increase in energy, this conservation of glandular activity and vital force that alcohol enables the system more perfectly to oxidize and assimilate the proteid elements of the food-stuffs; alcohol thus appears to sustain thoroughly or even increase the body-weight when the diet is insufficient. This favorable action, however, is only temporary in character and cannot be maintained indefinitely, but must be followed in due time by the requisite amount of nitrogenous food-stuffs or the bodily nutrition will ultimately fail.

In this light, alcohol becomes a valuable therapeutic agent in the management of many cardiac lesions, but in no sense can it be regarded as a food-stuff in itself. By improving the general nutritive condition in this secondary manner, and by regulating the heart's action and modifying the vascular tension, alcohol will often enable us to develop a compensatory hypertrophy of the heart-muscle more rapidly and more effectually than can be accomplished with any or all of the other therapeutic agents at our command.

In using alcohol it should always be borne in mind that it is rapidly oxidized, that it yields a large amount of energy, that it is a starvation compound and must have associated with it a liberal supply of nitrogenous compounds if the desired results are to be obtained. When alcohol is used, starch, sugar and fat should be omitted entirely or be taken in small quantities, otherwise nature will be deprived of the good effects that we are seeking to attain. We should also keep in mind the fact that where alcohol is used beyond the physiological limit it decidedly retards the oxidization of the proteid elements, lowers nutritive vitality, and the patient loses ground. When used in excess the effect is transitory; the functions of the body and especially those of the nervous system are exhausted instead of being strengthened, and depression is induced, with a constant craving for a similar kind of stimulation. Kept within these physiological limits, however, alcohol can never do harm but is a powerful aid to the system in disease and may often save valuable life when without it death must of necessity ensue.

The only sure guide to the use of alcohol in disease is found in the constitution of the urine and in its changes. When the digestion, assimilation and oxidization are perfectly effected, the normal standard will be maintained; but if disease attacks the system the reverse is the case. The relation between urea and uric acid is changed; the quantity of the former diminishes while the quantity of the latter increases. The alcohol should be administered until the urea rises and the uric acid falls to the normal standard. This accomplished, the heart's action and vascular tone will be placed in the best possible condition attainable from the use of alcohol.

CLINICAL MEMORANDA.

DEATH FROM ETHER.

BY MRS. CHARLOTTE B. BROWN, M.D.,
OF SAN FRANCISCO.

DEATH from ether is so rare that a record of each case seems of importance; hence the following report.

Mrs. H., a resident of Oakland, Cal., forty-one years of age; born in Indiana; had been married fifteen years, and had had two children, the youngest eight years of age; no miscarriages. Her mother is living and healthy at sixty-seven years; her father died of a fever at thirty years. Mrs. H. had never been a robust woman, and yet had never had any severe illness. About two years ago she began to suffer from uterine hemorrhage, and in the fall of 1889 consulted a gynecologist, who discovered and removed a small fibroid from the cervix. The operation was performed at her house, under ether, with prompt recovery.

In March, 1890, another fibroid, about an inch in diameter, was removed, also under ether, by the same physician, at his office. The parts were packed, and the patient was sent home in a carriage. On reaching home a violent hemorrhage occurred, and was with difficulty checked. She was blanched and never fully regained her former health and color. No mention of any other mass in the womb was made by the physician.

In January, 1891, and in March, profuse bleeding occurred. In March, Dr. C. Annette Buckel was called, and diagnosticated an intra-uterine fibroid, probably submucous. The hemorrhage was controlled and the patient liberally fed, and every means used to promote health and strength, with some success. But while the period in April was less profuse, in May it was more so, and her health began to fail. On June 1st she was sent to me for admission to the Hospital for Women and Children. The womb measured five and one-half inches and seemed to contain a single tumor. Examination showed heart, lungs and kidneys in as satisfactory a condition as was possible when general anæmia from loss of blood was so marked. I advised her not to delay entering the hospital. She did so, and was kept in bed during her menstrual period, when there was a moderate flow. Her appetite was good and her condition in no way unfavorable.

On June 10th a bundle of laminaria tents was introduced into the uterus and remained twenty hours. At 9.15 in the morning of the 11th, one teaspoonful of aromatic spirits of ammonia and one tablespoonful of whiskey were administered, and at 9.30 she was brought to the operating-

room. I listened to her heart as she was about to inhale the ether and heard nothing abnormal in the sounds. Her courage was good. Ether was given in a cone made of a towel, and she was very soon unconscious, the precise time not being noted. I irrigated the vagina, removed the tents, introduced a Barnes's dilator and distended it, followed by another of a larger size. I made a thorough examination of the mass, which was about three inches in diameter, attached by a broad base at the right posterior part of the fundus. I was working quite rapidly and was about to pass in the wire of the écraseur, when the assisting physicians said that her heart was beating poorly. A hypodermatic injection of tincture of digitalis and tincture of nux vomica, of each ten minims, was at once given. Her head slipped over the edge of the table, but no beat of the heart was felt. There were a few weak efforts at respiration for a moment or two, and then all was over. The faradic current was promptly applied and artificial respiration, by Sylvester's method, used. Hypodermatics of whiskey and ammonia were given repeatedly. These efforts were continued for an hour, but without avail. It was not more than five minutes from the first sign of collapse till she was dead, and not the slightest appearance of life was produced by all the means of resuscitation employed. I regret to be unable to record the quantity of ether used, but it was small, as she yielded to its action very promptly. It was less than a half-hour from her first inhalation before all was over.

The physicians present were Drs. Wanzer, Buckel, Smiley, LaFontaine, Nelson, Sherman and myself; all were most efficient in their labors in the case.

No post-mortem examination was made. The physician who was noting the pulse opened the patient's eyelid just after the first weak beat, and remarked that the pupils were widely dilated.

A CASE OF SKIN-GRAFTING FROM THE FROG.

BY GEORGE D. WESTON, M.D.,
OF FORT PAYNE, ALA.

IN a railroad wreck, George W., in addition to other injuries, was badly burned by steam. The parts burned extended from the nape of the neck to about four inches below the points of the scapulæ, and from the left shoulder-joint to the right, including at least two-thirds of the right upper arm, and especially the post-axillary fold. The inner third of the upper arm escaped. The burn was dressed with carbolized carron oil, the blisters having been cut just sufficiently to allow the serum to escape. On account of a dislocation of the clavicle, it was thought best for the patient to lie upon the back. The discharge was profuse and new blisters had to be opened each day. After a few weeks the skin and superficial fascia came off in large green sloughs; the discharge of pus was profuse and offensive, but the carbolized dressing soon stimulated the surface, so that healthy granulations sprang up and the whole surface was in good condition, but showed no tendency to the formation of skin. Some of the granulations were exuberant, and I had to cut them off with a knife and check their growth with nitrate of silver. The profuse discharge constantly weakened the patient and caused considerable elevation of temperature. I therefore had to use a great deal of stimulation. As something had to be done to induce the skin to form, I thought I would try skin-grafting, but the patient was so weak and had already so much surface granulating that he could not stand further denudation. I therefore thought I would try frog-skins. The white skin from the bellies of several frogs was removed, washed in clean water, cut into squares one-fourth or one-half inch across, and placed upon the granulated surface, the raw surface down. These were covered with oiled silk dipped in carbolized oil. The remainder of the back was dressed with benzoated oxide of zinc ointment. This was left for two or three days, the dressings, except the oiled silk, being changed at short intervals. When exposed, it was found that the grafts had a healthy, pink, transparent appearance, and the dressing was renewed as before. At the next dressing the grafts themselves could barely be distinguished, but, at the points where they were put on and for an inch or more around each, there was a pale bluish-white network that led me to infer that the grafts had been the means of inducing skin to form, but not in the same way I had seen in other skin-grafts—by forming a central island and spreading to meet that coming from the edges. From this time on, the patient continued to improve. The accident occurred March 22, 1890, and August 9th all had healed but a spot about the size of a silver dollar. At this time it was thought that a change of climate, by a visit to his old home near Boston, would complete the cure; so he was sent North on August 9th. He came back September 30th, with his back in a bad condition. Before going North, and during his stay there, large water-blisters would form, and these would have to heal like ordinary blisters. These proved very aggravating, both to physician and patient. As on his return I was away he was attended by my friend, Dr. Fowlkes, who used the benzoated oxide of zinc ointment that I had applied, and with fine success, so that when I returned, October 22d, the patient was nearly well again. From this time on, I dressed his back quite often, to look after the new blisters, and also to get the benefit of massage in causing the absorption of the excessive connective tissue that had been formed in the process of healing. This was especially marked on the right post-axillary fold. But by massage and use I think no operation will be necessary to obtain a fine and useful arm. There is at a few points a slight tendency to keloid-formation; otherwise the patient is perfectly strong and healthy. The scar has a thin tissue-paper appearance in most places, and as yet there is but little contraction.

A PRACTICABLE AND PAINLESS METHOD OF USING IODINE HYPODERMATICALLY.

BY A. O. SQUIER, M.D.,
OF SPRINGFIELD, MASS

IN THE MEDICAL NEWS of April 14, 1891, Dr. E. Fletcher Ingals, discussing the Shurly-Gibbes treatment of pulmonary tuberculosis, says: "It is usually best, excepting in advanced cases, to begin with iodine, though it is apt to cause considerable smarting," etc. In the *Therapeutic Gazette* for April, 1891, Drs. Shurly and Gibbes say: "The iodine solution gives considerable pain to some people, to others very little; but the gold solution gives little or none. We hope that a

solution can be made with lanolin, or something of that sort, which will obviate this objection in the case of iodine."

Having found the use of the iodine solution exceedingly painful, in one case so severe as to lead to the conclusion that if its use was persisted in, local anæsthesia, by means of spray or other more or less inconvenient method, must be resorted to, I found that the injection could be rendered absolutely painless by incorporating with the mixture as used by Drs. Shurly and Gibbes, a small quantity of creasote, or better, guaiacol. Another objection to the solution as prepared by Drs. Shurly and Gibbes is the large *quantity* necessary to be injected when it is desired to administer the full dose of one-half grain of iodine. This requires that sixty minims be introduced beneath the skin, and since the hypodermatic syringe, as usually made, has a capacity of but thirty minims, either the barrel must be unscrewed and refilled, the needle meanwhile being left sticking in the skin, or if the needle is withdrawn a second puncture must be made, all requiring time and causing additional pain. This might be avoided by increasing the strength of the solution, which, I infer, has been found impracticable, because of increased pain or other reasons. The object can be attained by incorporating iodoform in the solution to be used, and thus combined, the anæsthetic effect of the guaiacol is increased and prolonged. The formula that I have adopted after a number of trials as most eligible is as follows:

℞.—Eucalyptol, pure	32	minims.
Guaiacol, pure	16	"
Iodoform	8	grains.
Iodine	4	"
Ol. amygdal. dulc. (sterilized) q. s. ad	1	ounce.

Sig.—For hypodermatic use; 10 to 30 minims daily, or alternating with gold and sodium solution, as desired.

The anæsthetic properties of this solution are such that patients prefer its use to that of the gold solution, although the latter is nearly painless. Larger doses of the guaiacol and eucalyptol than is contained in the thirty minims of the above solution have, in my hands, caused excessive and exhausting sweating, with no proportionate benefit. The amount of iodine in this formula is the same as that contained in the Shurly-Gibbes solution, with, as will be seen, double that quantity of iodoform. Therefore the dose may be but one-third to one-half of that of the Shurly-Gibbes solution.

A CASE OF ANTE-PARTUM HOUR-GLASS CONTRACTION.

BY W. H. F. MILLER, M.D.,
OF CLIFTON FORGE, VA.

THE following is a brief report of a case of this very rare condition: On the evening of May 31st I was sent for to see Julia N., a mulatto, aged twenty-two, a primipara, who was in labor. On examination I found a left occipito-anterior presentation, with the os dilated to about the size of a twenty-five-cent piece. I left word that I would return in about an hour. Upon my return at about 10 o'clock I found the os as large as a fifty-cent piece and the pains irregular. I gave ten grains of sulphate of quinine, and retired to another room, telling the nurse to call me as soon as the character of the pains changed. About half-past twelve I was called and found that the second stage had set in, the pains being still slow and irregular, but decidedly expulsive. In half an hour the occiput was well into the inferior strait. During the next half-hour there was no advance whatever, though the patient appeared to have good pains. An examination did not show any cause for the arrest of the fœtus, either from abnormal parts in the mother or a too large head in the child. I therefore looked elsewhere, and found that during a pain the womb was divided into two spherical parts by a constriction about the middle, the two parts being about the same size. The constriction was constant, but the tension was increased during the pains. The fundus of the womb did not contract at all, and, as far as I could make out, the only change in the womb during the pains was the tightening in a transverse direction of this band of muscle. I applied one hand to the fundus and, for about fifteen minutes, pressed downward during each pain, but without any appreciable advance of the head; failing with moderate pressure to elicit any response from the womb, I stood up, and with each pain I placed both hands on the fundus and pressed downward and forward with as much force as I dared employ. The result was that after one or two pains the head began to advance and the womb contracted normally, except that the segmentation was very distinct even at the height of the pain. I left off pressure just as the head was ready to pass over the perineum, but the fundus again failing to act, I again continued the pressure, and the child, a medium-sized girl, was born in a few minutes. I examined the womb carefully after the end of the second stage, but could find no difference from the condition of the womb in an ordinary case. Slight traction on the cord, combined with expression, brought away the placenta without any trouble. The woman made an uninterrupted recovery.

Hour-glass contraction in the third stage of labor is a very common occurrence, and in these cases we have a contraction about the internal os; but in the case I have reported the contraction was at the centre of the body of the uterus. It seemed as if someone had a stout cord tied about the womb and that at stated periods the ends were drawn taut. There was, of course, no expulsive effect to the contractions, because the muscles merely seized the child and held it fast, thus rendering any advance impossible. I believe that only a single fasciculus of the circular muscles took part in these contractions, as the band was very narrow. The fundus, except under the stimulus of violent pressure, was inactive, yet after delivery the whole womb contracted very nicely. Of course, I expected to have difficulty in the third stage, yet there was no apparent extra contraction at the internal os. I gave ergot when the head was born, and this may have caused a regular contraction.

A METHOD OF CONTROLLING UTERINE HEMORRHAGE.

BY BRUCE PEDEN, M.D.,
OF BLOOMFIELD, ARKANSAS.

AFTER having vainly tried all ordinary methods, such as the employment of ergot, injections of astringents, etc., I recently controlled a severe case of uterine hemorrhage

by the following method: I took an ordinary rubber condom and introduced into it an ordinary male catheter, fixing the open end of the condom securely around the staff of the catheter by wrapping it several times with stout thread. I then adjusted a common syringe to the catheter and introduced the latter, carrying with it, of course, the condom, into the cavity of the uterus up to the fundus. This left the lower end of the rubber bag about on a level with the external os. I then proceeded to inject water into the cavity of the condom, speedily checking all hemorrhage. I could not have wished for a better result. I think this will be found a valuable means of arresting uterine hemorrhage by all who will give it a trial.

I shall try this method of arresting post-partum hemorrhage, by having a suitable apparatus made upon the same plan, with a larger bag, etc., and have the catheter of rubber, so that it can be left in position without inconvenience. The bag could, of course, be inflated with air, hot or ice-water, if necessary; in the first instance avoiding the weight of water, in the latter getting the benefit of heat or cold, as desired. The contents of the bag could be allowed to escape gradually, thus permitting the uterus to contract by degrees. The bag could be left in position for a considerable length of time without danger. I think this will have several advantages over intra-uterine tamponnement by means of strips of gauze, as suggested in THE MEDICAL NEWS of January 24th.

A NEW USE FOR ARISTOL.

BY JAMES J. LEVICK, M.D.,
OF PHILADELPHIA.

IN a case of poisoning of the hands from *rhus toxicodendron*—poison oak—recently under my care, which had reached the vesicular stage and was attended with much swelling and burning, the happiest results promptly followed the free dusting of the powder of aristol on the affected parts. The change was almost magical, so sudden and so prompt was the relief afforded. Might not this powder, applied in the early stage of the disease, do much toward preventing the ulceration and pitting of variola?

1900 ARCH ST.

MEDICAL PROGRESS.

For Vomiting after Chloroform Inhalation.—LENEWITSCH (*Med. Obstet.*, No. 1, 1891) succeeded in checking the obstinate vomiting in six cases following chloroform-narcosis by washing out the stomach with a one-half to two per cent. solution of soda. Not only was the vomiting at once controlled, but the general condition also improved.—*Centralbl. für Chir.*, May 23, 1891.

Primary Erysipelas of the Tongue.—GAREL (*Annales des Malad. de l' Oreille, etc.*, May, 1891) reports the case of a laborer, thirty-seven years old, who presented considerable swelling of the tongue which began at the anterior half, at a point of ulceration, the result of the influence of a carious tooth. The swelling was so great that the patient could not close the mouth, and there was profuse dribbling of saliva. In addition, there was a sense of debility, headache and fever. In the course of a few days the pharynx, and in succession, the cheeks, the nares, the eyelids, the ears and the scalp became involved.

Pleuritic Effusion containing the Bacillus of Eberth.—FERNET (*La Médecine Moderne*, May 21, 1891) reports the case of a boy of seventeen, who, two months after an attack of typhoid fever, developed a pleurisy, with serofibrinous effusion, in which the bacillus of Eberth was detected. In five other cases of pleurisy associated with typhoid fever, the bacillus was not found. Nevertheless Fernet believes that, in all, the pleurisy was dependent upon the bacillus of Eberth, and proposes the name typhoid pleurisy.

Hæmaturia due to Distoma Hæmatobium.—At a recent meeting of the Berlin Medical Society, NITZE (*Prager medicin. Wochenschr.*, May 13, 1891) presented a boy, with vesical tenesmus and burning micturition of a cloudy urine containing red and white blood-corpuscles, pus-cells and the characteristic ova and living embryos of the distoma hæmatobium. The boy, as well as two brothers who suffered similarly, had lived in Africa. A tumor in the bladder of the eldest brother, a result of irritative proliferation from the presence of ova, was removed by a supra-pubic operation; the subsequent improvement was only temporary, as the actual cause of the disorder is constituted by the presence of living distoma in the portal vein or in the perivesical veins.

The Influence of Epilepsy upon Secretion.—FÉRÉ (*La Méd. Mod.*, May 21, 1891) relates the case of an epileptic woman, nursing an infant, in whom withdrawal of the bromides was followed by a return of the seizures and cessation of lactation.

The Treatment of Aneurism of the Aorta by Potassium Iodide.—BALFOUR (*British Medical Journal*, June 6, 1891) details one case of aneurism of the aorta and makes reference to several others in which most satisfactory curative results were obtained by the administration of potassium iodide. To cure or even to improve an aneurism by the administration of the iodide the patient must not be starved, but must be well fed. The cure is effected by an hypertrophy of the walls of the sac, not by coagulating the blood within the sac, and is interfered with by lowering the nutrition. The iodide may possibly have some effect in producing hypertrophy of the fibrous tissues; indubitably, its most important effect is to cause a permanent lowering of the intra-arterial blood-pressure. To obtain so important a result it is not necessary to give the iodide in large doses. The proper course to pursue is to put the patient in the recumbent posture for several days, so that the normal pulse in recumbency shall be five or more beats lower than in the erect posture. Five grains of potassium iodide (sodium iodide has not the same effect) in some bitter infusion are given every eight hours, the pulse-rate being carefully observed daily at a stated time; after two or three days the dose of the iodide is increased to ten grains every eight hours. In this way the dose may be gradually increased until the pulse-rate is observed to rise; then the administration is withheld for a day and the previous dose resumed. As soon as the pulse-rate increases, the benefit ceases and the constitution begins

to suffer. But seldom is it necessary or advisable to increase the dose beyond ten grains every eight hours; commonly enough five grains suffice. The maximum of benefit is obtained from a dose just below that which lowers the blood-pressure so far as to cause the pulse-rate to rise. The remedy is administered every eight hours for two or three months. At the end of that time it need be administered but every twelve hours. The length of time the remedy should be continued depends upon the size of the aneurism when the treatment was begun. At least from three to six months are required to make the patient comfortable.

The Determination of the Number of Bacilli in Tuberculous Sputum.—Dissatisfied with the current methods of counting the number of bacilli in the sputum of tuberculous patients, NUTTALL (*Bulletin of the Johns Hopkins Hospital*, May–June, 1891) has devised a means for which he claims simplicity and accuracy. The total amount of sputum expectorated during twenty-four hours was caught in covered, scrupulously clean, conical glasses. According to the degree of viscidity of the sputum, a varying amount of 5 per cent. caustic potash solution was added to it (from one-sixth to an equal volume); after the sputum was rendered perfectly fluid, water was added to dilute the mixture. The sputum was then poured into a perfectly clean, wide-mouthed bottle containing fine (sterilized) gravel or broken glass. The conical glass was then rinsed out and cleaned of any still-adhering sputum by means of a measured amount of the caustic potash solution, which in turn was added to the sputum in the bottle. The latter, closed by a rubber stopper, was then transferred to a shaking machine, in which it was vigorously shaken for five minutes and then allowed to stand until the caustic potash had had time to act. Very viscid sputum was then warmed at body-temperature. As soon as the caustic potash had rendered the sputum homogeneous a measured quantity of water, usually an equal volume or less (preferably distilled), was added and the mixture again shaken. The sputum having stood for from two to four hours, was again shaken for from five to ten minutes. By means of a special apparatus, drops of the mixture of approximately equal size were spread upon cover-glasses, dried and surrounded by a delicate ring of a paint composed of lamp-black and serum. Over all was sprayed a thin film of diluted serum, which was fixed by heating the cover-glass at a temperature of from 176° to 194°. The caustic potash was extracted by alcohol. The specimens were stained with the Ziehl-Nielsen carbolized fuchsin and decolorized by alcohol and a mixture of water, 150 parts, alcohol 50 parts, and sulphuric acid from 20 to 30 drops. In counting, a square diaphragm, with an eccentric hair-line, was used with the eye-piece of the microscope. The fields were controlled by the use of a revolving disc in connection with the screw of the mechanical stage. Recording was facilitated by means of an automatic register. The method promises to be useful also in the study of bacterial cultures.

Œsophagotomy for the Removal of a Tooth-plate Long Impacted in the Œsophagus.—FURNER (*Lancet*, May 2, 1891) has reported the case of a woman, forty-four years old, in which, five and a half years before, a tooth-plate had slipped into the œsophagus. There was dysphagia of varying degree and occasional dyspnœa. A probang introduced into the œsophagus encountered an obstruction ten and a half inches from the teeth. Attempts to remove the plate by means of forceps were unsuccessful. Three months later œsophagotomy was performed. A portion of the plate was imbedded in the wall of the œsophagus. Considerable traction was required to bring the plate away. About an ounce of arterial blood escaped after the removal. No nourishment was given by the mouth during the first two days, but four ounces of pancreatized beef-tea were administered per rectum every four hours. On the third day an attempt was made to introduce food into the stomach through an elastic catheter passed from the mouth, but the milk was rejected. The attempt was repeated on the fifth day with a like result. On the evening of the fifth day the patient was raised in bed, and leaning slightly forward, was given milk to drink, which she swallowed and retained. Recovery now progressed favorably. On the twenty-first day after the operation the patient swallowed bread and milk; on the twenty-fourth day she took fish; on the twenty-eighth day the wound was healed.

Pilocarpine in Labyrinthine Disease.—In a paper read before the Philadelphia County Medical Society, DR. S. MACCUEN SMITH stated that he had treated with subcutaneous injections of pilocarpine hydrochlorate forty-seven cases of a greater or less impairment of hearing—in some there being almost entire deafness. The dose usually employed was one-sixth of a grain, although one-fourth of a grain was frequently necessary. In view of the possible danger to life in administering full doses of pilocarpine, some authorities advise the use of atropine or strychnine in conjunction with pilocarpine. This is a proper and safe precaution, and should be employed in suitable cases; yet in the greater number this was not found essential. As patients cannot usually stand the daily injection, an injection was made every second day, it always being *insisted* on that the patient remain *in bed* for from three to five hours after each injection, as the resulting perspiration continues for that length of time, and any undue exposure or exertion may cause unfavorable symptoms. The injections are continued until five, eight or ten have been given, and then, if additional ones are required, they may be administered at intervals of from five to ten days, as the symptoms indicate. As a result of his observations Dr. Smith has arrived at the following conclusions: Age and sex have no influence on the success or failure of the treatment of labyrinthine disease by means of pilocarpine, subcutaneously; in recently developed deafness, with tinnitus, this mode of treatment is much more promising of success than in cases of longer duration; cases of chronic suppurative otitis media, with some degree of impaired hearing, resulting from the exanthematous fevers, are not proper cases for treatment by this method; deafness, vertigo and tinnitus, in the course of syphilis, seem to be especially benefited by the subcutaneous injection of pilocarpine; good results can only be obtained from the full physiological effect of the drug; profuse diaphoresis must be obtained in every case.

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SATURDAY, JULY 25, 1891.

THE AMŒBA COLI.

THE interest of the subject of rhizopods as parasites has of late years received an important impetus from the study of the amœba of dysentery, or, as it has been designated, the amœba coli. The credit of first observing amœbæ in stools is due to LAMBE, who described such organisms that he had found in the dejecta of a child suffering with dysentery; but to LÖSCH belongs the credit of establishing these as definite parasitic organisms. The investigations of LAMBE, published in 1852, seem to have called forth no comment, excepting from LEUCKART, who, in his work on animal parasites, referred to them, but regarded the objects seen as merely altered intestinal epithelium. In 1873, however, LÖSCH, at St. Petersburg, discovered in the stools of a case of dysentery, amœbiform organisms resembling those of LAMBE; but, after a description that to this day stands as a model of scientific accuracy, concluded that the amœba he had discovered was different from that of LAMBE, and from its seat in the colon he named it the *amœba coli*. After a lapse of another ten years the subject was revived by KARTULIS, at Alexandria, and since his first publication in 1885 reports extending and confirming our previous knowledge have been made in all parts of the world. In Italy, GRASSE, PERRONCITO and LONTINO; in Austria, KLAVA; in India, CUNNINGHAM and LEWIS; in Germany, KOCH and GAFFKY; and in America, OSLER, COUNCILMAN and others—have each added facts of interest in the study of this organism.

Biologically the place of the amœba is not definitely fixed, nor can this indefiniteness be cleared up until a fuller knowledge of its cycle of life within and without the human body has been obtained. So much, however, may be taken as definitely determined, viz.: that we have to deal with an amœba distinct in all important characteristics from the other members of its family; and as to habitat it is probably never observed outside the living body and in the excretions of man and a few animals. According to LÖSCH, the most closely allied form is the *amœba princeps*, which differs in size, movements, and chemical reactions from the amœba coli. The size of the amœba coli varies from 10 to 35 μ, that of the amœba princeps from 20 to 60 μ; the pseudopodia of the amœba coli are projected and withdrawn in the same line, those of the amœba princeps are returned by a movement along the periphery of the body, with reduction in size until the pseudopod has entirely disappeared; by alcohol the nucleus of the amœba coli is made less visible, that of the amœba princeps more visible. These facts, with the added observation of a peculiar flowing of the granular protoplasm toward and into the pseudopodia, and a common vacuolation and distinctive granulation, render it certain that this organism is one hitherto unknown and undescribed. No further facilities appear to have been afforded LÖSCH for the continuation of his studies, and it remained for KARTULIS to utilize the abundance of material at Alexandria, and to clear up several important points in the life-history of the organism. Convinced by the uniform occurrence of the amœba in large numbers in the stools of tropical dysentery that there is more than mere coincidence or passive agency in this, he was in his subsequent labors led to study the stools of other diseases, and also to make experimental investigations as to pathogenicity. His statement (*Virch. Arch.*, Bd. cxviii. S. 97) that he has found the amœba in 500 cases of dysentery, but never in any other disease, should it receive confirmation from the investigations of others, will, if nothing more, go far toward establishing diagnostic value. But we must here interject the testimony of MASSINTIN, who, working

in the laboratory of LÖSCH, at Kigen, found amœbæ in the stools of five cases of various intestinal diseases not regarded as dysenteric; and, at the same time, we may add that the claim of KARTULIS that the finding of these forms is sufficient to establish the diagnosis of dysentery, is, in the present state of our knowledge, not warranted.

As to pathogenicity, it is of interest to note the recent statement of COUNCILMAN, that as in pneumonia, so in dysentery, there may be a variety of causative agents; and, consequently, if in certain cases the amœba be proved absent, in others it may still have great significance.

The anatomical distribution of the organism is also suggestive. First seen in the stools, it was next discovered in an intestinal ulcer by LÖSCH, in the pus of liver abscess by KARTULIS, in the bloodvessels of the liver by KOCH, and finally in the expectoration of cases of liver abscess and diaphragmatic perforation by OSLER. These facts, and the uniformity of their occurrence, together with the common observation of bacteria, blood corpuscles, and all manner of débris within the amœba, lends some probability to the view of KARTULIS that liver abscess results from a migration of the bacteria-laden amœbæ through the blood-paths into the liver. But little is proved as regards the causation of the dysentery, and in no sense do the facts warrant the further assumption of KARTULIS that the pyogenic bacteria thus transported to the liver can excite suppuration only in areas degenerated and prepared for suppuration by the action of the amœbæ.

Of great interest and value are the experiments on animals. By injecting *per rectum* mucus from the stools of his case, LÖSCH was able to set up gastro-intestinal disorder in one of four dogs, and he found in the excreta of this animal large numbers of the amœbæ that had previously been wholly absent. Latterly KARTULIS has succeeded in producing experimental dysentery in cats by similar injections with mucus of the dysenteric stools, as well as with pure (?) cultures of the amœbæ which he has obtained in straw decoctions. He failed in dogs, guinea-pigs and other animals. These experiments, though highly interesting, cannot be considered demonstrative, because they fail in the non-exclusion of other organisms that may have been injected at the same time with the amœbæ; and they also fail from want of uniformity in the results obtained.

A careful and unprejudiced review of the literature of this subject would seem to indicate the probable pathogenic significance of the amœba coli, and it may be credited with a diagnostic value of a fair degree of certainty. It may be added that at least in one case its presence has made it possible to diagnosticate an unsuspected liver abscess, and in similar cases it may hereafter prove of like value.

THE ADVERTISER.

IF it be thought extreme to say that the medical profession in the United States is at the parting of the ways as regards the adoption or rejection of advertising practices by the physician, it cannot be held an exaggeration to say that a certain number of the members of that profession are always a little more than ready to take the left-hand road. Slyness, cunning, the ease of concealment of indirect methods of advertisement, perhaps also a general lowering of ethical standards, make it progressively more difficult to deal with those who combine an itching for public notice and selfish gain with a deplorable want of self-respect and professional honor.

We all know them perfectly well—these fellows that get themselves and their doings into the daily papers—and we understand exactly how the reporters get possession of the facts. It is the men of a certain well-understood type of character that are thus deceived by their hospital-residents and the enterprising reporters. The honest man has no difficulty in shutting off the reporters and controlling his assistants. We know also that they cannot be caught, and they themselves know it quite as well. Moreover, it is equally well known that those who have the ability to put a stop to advertising have not the moral courage to do it. It is a strange lethargy—a sort of sleeping-sickness that seems to deaden the professional conscience and hide from it the seriousness of its disease. There are to-day two or three fatal tendencies benumbing and dragging us toward ruin—the hospital-abuse, the compromise with open quackery outside, and with concealed quackery inside the profession. But circulating in the body professional there is a more subtle poison, and one far more dangerous than either of these. This is the rule-or-ruin policy of men intellectually and immorally strong. It is but another outcropping of the dominance of the modern hotly-pursued ideals of shrewd greediness united with unscrupulousness—ideals that are ruinously active in political and mercantile life.

In medicine it is distinctly a new phase, and one that it were better to estimate at full value. It must be squarely met and judgment decisively pronounced upon it. Early in his medical life a man will range himself with one party or the other; consciously or unconsciously he will join the party of the scheming pushers or the party of the honest workers. *Gleich und gleich gesellt sich gern.* The success of one unscrupulous politician debauches by example a hundred imitators, and concealed or brazen advertising becomes an art cultivated with persistent zeal. The novel aspect of the case consists in the fact that this species of advertiser is not scientifically a fraud or a quack, but it is a part of his stock-in-trade to be well abreast of scientific progress. He will swim with the tide, adopt the pseudo-scientific craze of the hour, even profess the greatest interest in genuine medical science, cultivate technical skill, and so forth. All this looks to success, and success, regardless of means and methods, is his sole aim. To reach it he will "wire-pull" himself into official positions, become a teacher, professor, visiting physician to hospitals, and finally spread the reports of his cures and wonderful surgical operations before the admiring gaze of the gaping newspaper-reader. The young physician looks on amazed that the censors of medical societies to which the advertiser belongs ignore these facts, and the young man says it is only the little fellows, they who need it most, that dare not advertise, and the young man at once resolves that the rule shall mighty soon be circumvented. In the meantime the "Boss TWEEDS" of medical politics are asking with ever bolder effrontery, "What are you going to do about it?"

Let us emphasize the patent fact that the evasion of action, the shirking of evident duty, and the permission of silence will never cure the evil. It is upon this cowardice that these cunning schemers count, and it is the condition of their success. As we all know, there is one way and only one way of making an end of all this. The respect or the supposed respect and comradeship of one's fellows and equals is at once the motive of true ambition, and in this case the absolute *conditio sine qua non* of professional success. Expel a few of these advertisers from honorable medical societies and there will be a sudden change in their manners and their methods of achieving professional success. Seeming harshness in such cases is not real harshness; it is for the final good even of the advertiser himself.

ALCOHOLISM.

THERE are extremists upon all debatable questions. The truth, however, can be arrived at only by impartial discussion and broad observation. It should not be perverted by blind fanaticism, nor should it be obscured by ignorance. Illiberalism is a bar to progress, and can only result in evil.

There are well-meaning persons who insist upon calling the excessive use of alcohol disease. It were as justifiable to similarly designate excessive smoking, or the persistent, injudicious indulgence in a favorite article of diet. Indolence, theft and immorality are as much diseases.

The excessive use of alcohol may be considered a morbid habit, in the same way as is the addiction to morphine, or opium, or cocaine, or tobacco, or coffee, or tea. The results of the habit and the sequelæ to which it gives rise must not be confounded with the influences that lead to the habit.

Apart from all prejudice, alcohol has legitimate uses. It is a valuable medicament. Properly administered, in conditions of low vitality, it is not merely a useful stimulant; it is also a valuable food, its efficacy depending upon its ready combustion and the production of force.

It were as rational to banish from the materia medica opium or strychnine, or caffeine or cod-liver oil, as to exclude alcohol; but it may be added that the materia medica is the exclusive place for the agent. Like most medicaments, it is powerful for evil as well as for good, and its administration should be under the control and guidance of competent persons. Its indiscriminate use should no more be permitted than should that of opium or strychnine.

That even the medicinal application of alcohol is abused cannot be contradicted. The same criticism may be applied as well to digitalis and to opium, but no one would ask that the use of these be proscribed and none would claim that their excessive use was an evidence of disease.

Recognizing the far-reaching evil results to which the injudicious, or even the judicious, administration of such medicaments as alcohol, opium, morphine, cocaine, chloroform and ether may give rise, the physician must exercise the wisest discretion in the use of any and of all of them.

From the social and economic point of view the remedy for the abuse is as difficult as is that for the excessive use of tobacco or for prostitution.

CORRESPONDENCE.

HOMŒOPATHY.

To the Editor of THE MEDICAL NEWS,

SIR: In reference to your editorial article on the "Homœopathic Convention," which informs your many readers that THE MEDICAL NEWS has decided opinions concerning homœopathists, I wish to draw your attention to a few undeniable facts.

Let any scientist carefully study the steady advance of medicine during the last century, and especially the last decade; let him note the progressive march toward that goal, so much desired, so much fought for by all medical minds, the establishment of medicine as a science, combined with the art to carry out its dictates—and he must acknowledge that of all the eminent men that have led us in this earnest search for truth, not one was a homœopath. Whether we enumerate the instruments of precision to-day employed in the investigation of disease, whether we take up the astonishing results obtained by modern physiological study, or whether we let pass before our view the "dawning of the new day," the revolution in the pathogenesis of infectious disease, we must invariably answer the question, *Did a homœopath contribute one iota to these successes?* with an imperative, *No!* The stethoscope, its self-registering thermometer, the sphygmograph and all the many instruments of precision enabling us to note the slightest deviation from health, were invented by regular physicians. The profound researches that led to the demonstration of the ptomaïnes and toxalbumins, that showed us the intricate metabolic process underlying the function of each individual cell, the wonderful unravelling of the network of paths, apparently so confused and yet so clear and definite, uniting the cortical centres and all the ganglia with every part of the animal organism depending upon them—did a homœopath participate in the minutest portion of them? No.

And when we finally come to bacteriology, the latest addition to our science, yet small but destined to cause the greatest revolution ever set in motion in any branch of human knowledge: who proved to us the cause of infectious diseases? Who made the first step in the direction that is bound to lead us to the total prevention and the complete cure of those zymotic diseases which have decimated mankind for thousands of years? No homœopath, for certain.

But read their journals, watch the proceedings of their debates! They adopt the results of our researches and make use of our discoveries without the least right and without hesitation!

Has there ever been an instance in which any result obtained by homœopaths in their so-called investigations has been adopted by the regular profession? Can anyone name any invention, any discovery, anything that proved a boon to humanity, that became the property of the whole civilized world, that has originated in homœopathy?

Only one principle—*similia similibus*—brought them adherents. And if we remember, that in its application Hahnemann quoted the itch and advised, therefore, the powdering of the crusts that developed in consequence of the scratching, and the infinitesimal dilution of this powder used internally as the sovereign remedy against a disease that *our* research soon after proved to be due to a parasite, easily destroyed by a little potash, soap and sulphur, it must appear as an outrage to real science to allow the promulgation of such nefarious theories. What would sensible people say to-day, if a child had lice and we gave the powdered lice and the dandruff, etc., internally as a remedy for the lice? That is exactly Hahnemann's method in the itch!

There is but one way out of the difficulty—we must feel and show our contempt for homœopathy. It is a humbug from beginning to end and will die a natural death. The more we advance in our science—and indeed we are making giant strides—the higher the education of the population, the longer the term for the study of medicine and the severer and the more impartial the State Board examination of candidates for the right to practise, the quicker homœopathy and all other dogmatic -pathies will die.

Name one eminent mind in the medical fraternity, whose name is known all over the world, who has ever become a homœopath. And of all the homœopaths who have become known in the small circle of their immediate neighborhood or in their own homœopathic boundaries, name me one who has achieved something greater than Dr. Hering, who used to be looked upon by his confrères as their most illustrious representative, and whose main achievement was the discovery of the magnetic influence that shows itself in practising the following procedure:

Some infinitesimal dose, say the millionth part of a drop of the tincture of aconite dissolved in a glass of water will have the best effect if the glass be held in the *left* hand while we have full moon and the diluted stuff be then slowly sipped!

It is ridiculous, horrible, to think of it. No wonder that they have nothing to say in their conventions except about laws that may insure to them a longer life and do away with the necessity of study. Take any body of learned men and bring before them a physician and a homœopath. Let the latter tell all that he knows of the pathogenesis, the pathology, the symptoms and course, and the treatment and prophylaxis of tuberculosis, provided it be stipulated that he cannot draw upon the knowledge gained and discovered by the true medical profession *after* Hahnemann's death, and then give the physician the same opportunity! What would be the judgment of such a jury?

HUGO ENGEL.

NEWS ITEMS.

The American Dermatological Association will hold its fifteenth annual meeting at Washington, D. C., September 22, 23, 24 and 25, 1891.

The following papers will be read:

FIRST DAY.—SEPTEMBER 22D.

Dermatitis Hæmostatica, by Dr. H. G. Klotz.

A Case of Lupus Erythematosus with Fatal Complications, by Dr. W. A. Hardaway.

Report of a Case of Universal Erythema Multiforme, with colored portrait and specimen, by Dr. L. A. Duhring.

An Unusual Case of Sarcoma involving the Skin of the Arm; Amputation; Recovery, by Dr. F. J. Shepherd.

Multiple Sarcomata: History of a Case Showing Modification and Amelioration of Symptoms with Large Doses of Arsenic, by Dr. S. Sherwell.

SECOND DAY.—SEPTEMBER 23D.

Discussion on Tuberculosis of the Skin:

Its Clinical Aspects and Relations, by Dr. J. C. White.

Its Pathology, by Dr. J. T. Bowen.

Its Treatment, by Dr. G. H. Fox.

Thirteen Cases of Tuberculosis of the Skin, with their Treatment, by Dr. J. S. Howe.

A Case of Lichen Scrofulosorum, by Dr. J. Grindon.

Notes of a Visit to the Leper Hospital at San Remo, Italy, with Photographs, by Dr. L. A. Duhring.

THIRD DAY.—SEPTEMBER 24TH.

The Treatment of Alopecia Areata, by Dr. P. A. Morrow.

A Therapeutic Note on Alopecia Areata, by Dr. L. D. Bulkley.

Morphœa Atrophica of Wilson, by Dr. R. W. Taylor.

The Treatment of Pruritus, by Dr. E. B. Bronson.

Prairie Itch, by Dr. L. N. Denslow.

Diseases of the Skin Associated with Derangements of the Nervous System, by Dr. W. T. Corlett.

Treatment of Chronic Ringworm in an Institution for Boys, by Dr. L. A. Duhring.

FOURTH DAY.—SEPTEMBER 25TH.

Notes of a Case of Acute Dermatitis Exfoliativa, by Dr. J. E. Graham.

Note Relative to Pemphigus Vegetans, by Dr. J. N. Hyde.

A Study of Mycosis Fungoides, with Report of a Case, by Drs. H. W. Stelwagon and H. Leffingwell Hatch.

Lymphangioma Circumscriptum, with Report of a Case, by Dr. M. B. Hartzell.

Remarks on Carbuncle, with Report of a Peculiar Case, by Dr. H. G. Klotz.

Note on Erythema et Nævus Nuchæ, by Dr. C. W. Allen.

A Case of Lichen Ruber, by Dr. J. Grindon.

The Personal Equation in Dermatology, by Dr. L. D. Bulkley.

The American Orthopedic Association will hold its fifth annual meeting at Washington, D. C., September 22, 23, 24 and 25, 1891.

The following programme is announced:

FIRST DAY.—SEPTEMBER 22D.

The President's Address, by Dr. A. B. Judson, of New York.

The Orthopedic Work of the Late Mr. Thomas, by Dr. A. J. Steele, of St. Louis.

Uniform Nomenclature in Orthopedic Surgery, by Dr. W. R. Townsend, of New York.

Two Cases of a Peculiar Type of Primary Crural Asymmetry, by Dr. Henry Ling Taylor, of New York.

On the Best Means of Preventing a Loose Joint, or Dangling Limb, after Resection at the Shoulder-joint, with an Illustrative Case, by Dr. W. R. Whitehead, of Denver.

A Case of Spina Bifida with Partial Motor and Sensory Paralysis, Double Equino-varus and Purulent Bursitis, by Dr. H. Augustus Wilson, of Philadelphia.

Congenital Club-foot, with Absence of Great Toe and Contiguous Bones of the Instep, by Dr. T. M. L. Chrystie, of New York.

A Case of Club-foot, Club-hand and Multiple Joint-deformity, by Dr. William E. Wirt, of Cleveland.

On the Use of the Wrench in the Treatment of Club-foot, by Mr. Robert Jones, of Liverpool.

Operation upon the Concave Surface in Talipes Equino-varus, by Dr. B. E. McKenzie, of Toronto.

The After-treatment of Excision of the Knee-joint, by Dr. John C. Schapps, of Brooklyn.

Gonorrheal Rheumatism and its Treatment—Primary and Secondary, by Mr. B. E. Brodhurst, of London.

Atrophy in Joint Disease, by Dr. E. G. Brackett, of Boston.

The Diagnostic and Prognostic Value of High Temperature in Chronic Joint Disease, by Dr. Robert W. Lovett, of Boston.

On the Tests for Recovery from Joint Disease, by Mr. Robert Jones, of Liverpool.

Apparatus for Making Traction, by Dr. William E. Wirt, of Cleveland.

Some Lateral-traction Fixation Hip-splints, by Dr. A. M. Phelps, of New York.

SECOND DAY.—SEPTEMBER 23D.

Rhachitis in Adolescence, by Dr. Bernard Bartow, of Buffalo.

The Aspirator in Orthopedic Practice, by Dr. Ap Morgan Vance, of Louisville.

Congenital Misplacement of the Hip, with New Apparatus for its Treatment, by Dr. A. M. Phelps, of New York.

A Study of Atrophies, by Dr. Roswell Park, of Buffalo.

The Diagnosis of Pott's Disease, by Dr. Robert W. Lovett, of Boston.

The Differential Diagnosis in Pott's Disease, by Dr. Geo. W. Ryan, of Cincinnati.

Syphilitic Pott's Disease in Children, by Dr. John Ridlon, of New York.

Pott's Disease and Pregnancy, by Dr. T. Halsted Myers, of New York.

Paraplegia in Pott's Disease, by Dr. E. G. Brackett, of Boston.

Pressure-myelitis in Pott's Disease, by Dr. Albert Hoffa, of Würzberg.

Abscesses in Pott's Disease, by Dr. Herbert L. Burrell, of Boston.

Abscesses in Pott's Disease, by Dr. W. R. Townsend, of New York.

The Evacuation of Spinal Abscesses without Drainage, by Mr. George Arthur Wright, of Manchester.

Bilateral Lumbar Abscess, with a Case, by Dr. James K. Young, of Philadelphia.

The Benign Course of Abscesses in Pott's Disease under Efficient Mechanical Treatment, by Dr. Newton M. Shaffer, of New York.

The Value of Mechanical Treatment in Old and Neglected Cases of Pott's Disease, by Dr. Henry Ling Taylor, of New York.

The Mechanical Treatment of Pott's Disease, with an Exhibition of Apparatus, by Dr. A. M. Phelps, of New York.

THIRD DAY.—SEPTEMBER 24TH.

Malignant Disease of the Vertebræ Simulating Pott's Disease, by Dr. A. B. Judson, of New York.

Paralysis in Pott's Disease, by Dr. Charles L. Scudder, of Boston.

Prognosis in Pott's Disease, by Dr. Samuel Ketch, of New York.

Proposed Treatment of Pott's Disease by Wiring the Vertebral Processes, by Dr. B. E. Hadra, of Galveston.

The Operative Treatment in Spinal Caries, by Dr. De Forrest Willard, of Philadelphia.

The Treatment of Pott's Disease, with especial reference to the Early Stage, by Dr. Bernard Bartow, of Buffalo.

Pott's Disease in Adults, by Dr. A. J. Steele, of St. Louis.

Pott's Disease in Middle and Advanced Life, by Mr. Howard Marsh, of London.

Cervical Spondylitis, by Dr. L. A. Weigel, of Rochester.

The Prevention of Unnecessary Deformity in Pott's Disease, by Dr. Royal Whitman, of New York.

A Brief History of the Use of Suspension in Pott's Disease, by Dr. Benjamin Lee, of Philadelphia.

Recumbency in Pott's Disease, by Dr. Ap Morgan Vance, of Louisville.

Extension in Pott's Disease, by Dr. B. E. McKenzie, of Toronto.

Extension in Bed, by Dr. Charles C. Foster, of Cambridge.

Traction and Fixation in Pott's Disease, by Dr. Reginald H. Sayre, of New York.

The Treatment of Pott's Disease, by Dr. V. P. Gibney, of New York.

Comparative Value of the Present Modes of Treatment of Caries of the Spine, by Dr. E. H. Bradford, of Boston.

FOURTH DAY.—SEPTEMBER 25TH.

A Further Contribution to Typhoid Spine, by Dr. V. P. Gibney, of New York.

The Treatment of Congenital Dislocations of the Hip, by Dr. E. H. Bradford, of Boston.

On Elongation of the Ligamentum Patellæ as a Factor in the Production of Certain Knee Troubles and Difficulties in Locomotion, by Dr. Newton M. Shaffer, of New York.

Observations on Torticollis, with particular reference to the Significance of the So-called Hæmatoma of the Sterno-mastoid Muscle, by Dr. Royal Whitman, of New York.

Ten Cases of Excision of the Knee-joint for Disease, and their Lessons, by Dr. Joseph D. Bryant, of New York.

Rheumatic Spondylitis, by Dr. Geo. W. Ryan, of Cincinnati.

The Definition and the Scope of Orthopedic Surgery, by Dr. V. P. Gibney, of New York.

The Relations of Lateral Curvature of the Spine and Flat-foot, by Dr. Paul Redard, of Paris.

Pathological Anatomy of Lateral Curvature of the Spine, by Dr. F. Beely, of Berlin.

Means of Recording Rotation in Lateral Curvature, by Dr. E. H. Bradford, of Boston.

A Contribution to the Etiology of Lateral Spinal Curvature, by Dr. Charles L. Scudder, of Boston.

Modifications in the Treatment of Lateral Curvature, by Dr. E. H. Bradford, of Boston.

Spastic and Infantile Paralyses, by Dr. De Forrest Willard, of Philadelphia.

The Operative Treatment of Spastic Paralysis, by Dr. L. A. Weigel, of Rochester.

The Operative Treatment of Spastic Paralysis, by Dr. Charles L. Scudder, of Boston.

Additional Notes on Sacro-iliac Disease, by Dr. Benjamin Lee, of Philadelphia.

Wilhelm Weber, the physicist and biologist, of Göttingen, is dead.

Dr. J. P. Crozer Griffith has been elected Clinical Professor of the Diseases of Children in the University of Pennsylvania.

Dr. G. Frank Lydston has been elected Professor of Genito-urinary and Venereal Diseases in the Chicago College of Physicians and Surgeons.

The German Anatomical Society will hold its congress of next year at Vienna. The local committee consists of Toldt, Zuckerkandl and v. Ebner.

Rush Hospital.—The announcement is made that the dispensary service of the Rush Hospital for the treatment of consumption and allied diseases is now open. The clinics are held daily (Sundays excepted) at 2 P.M., at the northeast corner of Twenty-second and Pine Streets.

OFFICIAL LIST OF CHANGES IN THE STATIONS AND DUTIES OF OFFICERS SERVING IN THE MEDICAL DEPARTMENT, U. S. ARMY, FROM JULY 14 TO JULY 20, 1891.

PAGE, CHARLES, *Colonel and Surgeon.*—Heretofore assigned to duty in the Division of the Atlantic, will report to the commanding general Department of the East, for assignment to duty as Medical Director, and CHARLES T. ALEXANDER, *Lieutenant-Colonel and Surgeon*, will report for assignment to duty as Attending Sugeon, New York City, N. Y.

MCCLELLAN, ELY, *Major and Surgeon.*—Heretofore assigned to duty in the Division of the Missouri, will report to the commanding general Department of the Missouri, for assignment to duty as Attending Surgeon, Headquarters Department of the Missouri, and Examiner of Recruits at Chicago, Ill.

BROWN, PAUL R., *Assistant Surgeon.*—Leave of absence extended one month.

COMMUNICATIONS are invited from all parts of the world. Original articles contributed exclusively to THE MEDICAL NEWS will upon publication be liberally paid for, or 250 reprints will be furnished instead of payment, provided that the request for reprints be noted by the author at the top of the manuscript. When necessary to elucidate the text, illustrations will be provided without cost to the author.

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